Information System for Birkby Videos

Mohammed Qasim
BSc Computer Science
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Summary

This project had the aim of creating a system for a DVD rental business Birkby Videos. This involved creating a database application for the day to day running of the business, and a website for its existing members. The project was a success all the requirements were achieved and surpassed.

The following was achieved in the project:

- User requirements were gathered and analysed, and the system was designed according to the user requirements. The system was then implemented, tested and evaluated.
- A database application for Birkby Videos was created. Which was able to carry out the following operations:
    1. Store details of all the members and DVD titles in stock.
    2. For every member and for every DVD show when a DVD was rented, due back and when returned.
    3. Search for the details of a particular member or DVD.
    4. Keep a record of how many times a DVD title has been rented and how much money it has made.
    5. Show the full DVD rental history of the DVD's and members.
    6. Show all the current DVD titles on loan.
    7. Allow a member to have online access.
- A website for existing members was created. Which was able to carry out the following operations:
    1. Members can check what DVD's they have on loan and when they are due back.
    2. Members can change their login password online.
    3. Members can view the current contact details the business holds and can change their contact details online.
    4. Members can view information about the business, how to contact it and its opening times.
- A non-technical user manual for the database application was also created.

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Chapter 1

Introduction

1.1 Introduction

This section will briefly give an overview of the project, what it is about and the minimum requirements.

1.2 The Problem

My uncle just recently opened a DVD rental business called Birkby Videos. He was working in a paper based environment and his business was growing, the number of members he had was growing along with his stock of movies, and it was clear to him that he needed some sort of information system for the business.

At that time he recorded details of all his members and DVD's on paper, along with what DVD's were on loan, by whom and when they were due back etc. So he wanted to computerise this part of the business, to assist his business to run efficiently and effectively. Along with this he wanted some sort of web presence to promote his business and for his members to be able to check their records online.

There were off-the-shelf DVD rental software packages available, like Rapid Rental, Video Vision and Winrental. But my client wanted something simple, tailor made for his needs only and where users could access their details over the internet. These software packages did not offer these requirements. There were also many business solution companies like Motion Software and Solutions By Computer that did offer these services, they tailor make software to suit your business needs, whatever the requirements. My client did consider this approach, and he concluded that this was not appropriate for a small business like his, because the cost was too high, it outweighed the benefits.

1.3 Aim

The aim of this project is to analyse the information needs and produce an appropriate information system for a DVD rental business.

1.4 Objectives

The objectives of the project are to:

- Analyse the information needs of the business.
- According to the business needs produce an appropriate information system.
- The system will consist of a database which will store details of all the members/DVD titles and be able to carry out all the required operations carried out by the business.
- The information system will also consist of a website which will be linked to the database and where members will be able to check their records online.

1.5 Minimum Requirements

The minimum requirements are:

- A prototype database for a DVD rental business. Which will be able to carry out the following operations:
    1. Store details of all the members and DVD titles in stock.
    2. For every member and for every DVD show when a DVD was rented, due back and when returned.
    3. Search for the details of a particular member or DVD.
- A website for existing members where they can check what DVD's they have on loan and when they are due back.

1.6 Extensions

The extensions that were carried out are:

- The prototype database is able to carry out the following additional operations:
    1. Keep a record of how many times a DVD title has been rented and how much money it has made.
    2. Show the full DVD rental history of the members.
    3. Show all the current DVD titles on loan.
- The website is able to carry out the following additional operations:
    1. Members can change their login password online.
    2. Members can view the current contact details the business holds and can change their contact details online.
    3. It has an additional webpage for business opening times and a contact us page.
- A non-technical user manual for the database application.

1.7 Deliverables

- The final project report.
- A database, along with a website which connects to the database.
- A non-technical user manual.

1.8 Project Schedule

The Gantt charts for the initial project schedule, along with the actual project schedule can be seen in Appendix B.

1.9 Structure of the Report

The report will reflect the structure of the development process. The first section includes the aim, minimum requirements and the objectives of the author. The following section covers the examination of the technical aspects and system developments methodologies. This will be followed by the analysis, design and implementation sections. The application will then be tested and evaluated in the appropriate sections. Finally it finishes with a conclusion concerning the overall success of the project.

Chapter 2

Background Research

2.1 Previous Projects

There have been many similar projects carried out in the past that involved building some sort of system for a business. So it was in my interest to look into these projects to see what aspects I could adapt that were successful and what advice the authors had for someone who was going to do something similar.

All the projects I looked into were giving similar if not the same advice. [18] and [19] both pointed out that when creating a system ensure functionality first, then worry about the features later, as this would ensure that the system is produced on schedule and meeting the user requirements. Both the authors underestimated the time required to write up the final report, I will aim to leave ample time in my schedule for the write up and I will try to write extracts for the report throughout the project process to minimise the workload at the end.

Another thing both authors, along with others also pointed out were the importance of always keeping the user in mind. You could produce the most technically advanced system, but if the system does not meet the user requirements or the user does not like the end system, the project will essentially not be a success. So it was important I took note of this advice and implemented it in my project.

2.2 System Development Methodology

Before design and implementation can begin on the system, it is important to decide which system development methodology to employ. I only researched the methodologies that were relevant to this project.

2.2.1 The Waterfall Model

"This is the classical model of system development" [1], it consists of a sequence of simple stages working from top to bottom, as shown in figure 1 below. Each stage is represented by boxes and each stage has to be completed before work on the following stage starts, and the outputs of one stage are used as inputs to the next one. The waterfall model works best when

the level of reworking of the product is minimal and the products remain unchanged after the completion of that stage [2]. There is no room for major changes to requirements/design etc. as these changes may be necessary, when carrying out the further development or improving the solution and it is clear the rigid structure of this model will not be suitable for this project.

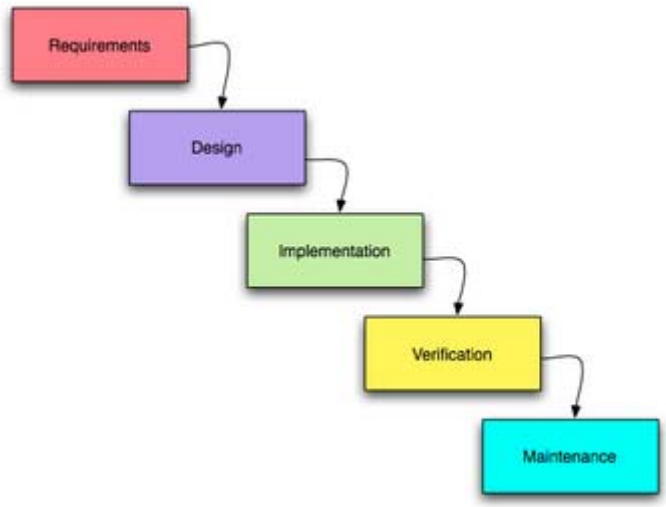


Figure 1 The Waterfall Model [3]

2.2.2 The Spiral Model

The Spiral model differs from the waterfall model in that it introduces an iterative approach to system development [2]. The spiral model (see figure 2) is a lot less rigid in its approach, it allows for constant movement between levels of the development process and the life cycle of the system. It allows you to change the requirements, re-design and re-implement with each rotation of the spiral, this is because the models stages are cycled and reversible. However one drawback of this model is when implemented it may lead to endless work as it is difficult to get the system perfect and, as explained in [5], there is no clear cut stopping point when using the spiral model.

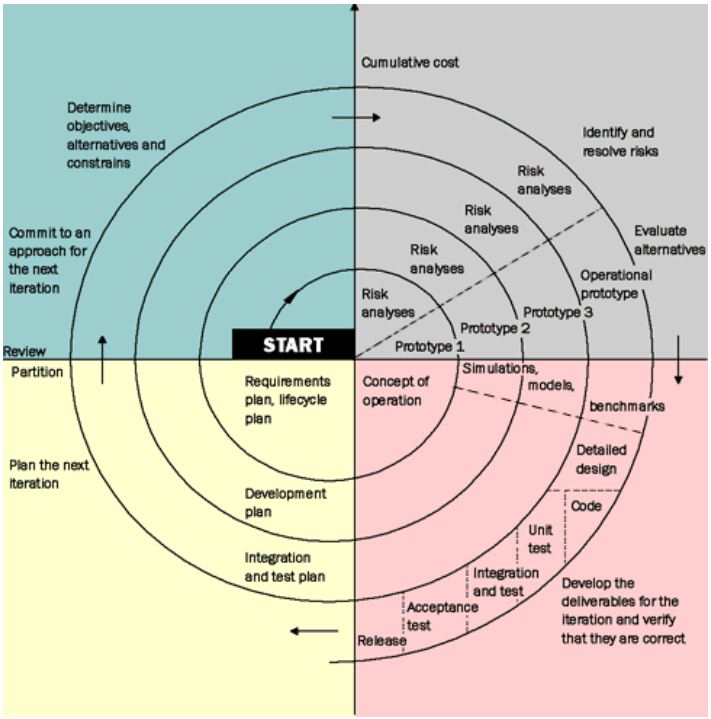


Figure 2 The Spiral Model [4]

2.2.3 Prototyping

The principle of prototyping is to note the reaction of the user to the prototype of the system and this enables the developer to gain an insight into the users thoughts about the system and assess the extent to which it meets their needs. Prototypes can be classified as either throw-away or evolutionary [1]. Throw-away prototype is used only to test out some ideas and is discarded after the required information is gathered. Evolutionary prototype is constantly developed and modified until the user requirements are met [1]. Prototyping allows for the user to have a more active involvement in the design decisions of the system, with their timely involvement this allows the user to be able to test the system before it is completed and appropriate changes can be made. This high level of involvement allows the user to get a feel for how the system is likely to work in practice [1]. However, since the developer focuses their attention on the prototype, this limits the time needed to create any documentation or test the product [2].

2.2.4 RAD

RAD (Rapid Application Development) is a methodology for “compressing the analysis, design, build and test phases into a series of short, iterative development cycles” [17]. It was developed to respond to the need to deliver systems very quickly. Since the developer and user agree on the design before implementation begins, the system can be developed quickly

with no interruptions. However, there is a tendency for RAD projects to contain errors, as things can be over looked due to its 'rapid' nature.

2.2.5 Choice of Methodology

I chose to adopt the Prototyping methodology for this project, as I believed it suited this project best. It allows my client to have an active involvement in the development of the system and appropriate changes can be made during this process. The Waterfall model was ruled out because of its rigid structure, there is little or no room for changes to the requirements/design during the development process and it may be necessarily when carrying out further development. The Spiral model was ruled out because it may have lead to endless work, since there is no clear cut stopping point when implementing this model, and Rapid Application Development projects have a tendency to contain error, because things can be over looked due to its nature.

2.3 Tools

There are a verity of tools that I will need to use in order to complete this project.

- Database management system to store all the required data.
- Server side scripting language to retrieve information from the database.
- Client side scripting for the web pages.
- A server for the system.

2.3.1 Database

There are four main DBMS (Database Management Systems) that could have been used to store the required data for this project.

2.3.1.1 Microsoft SQL Server

SQL server would be the ideal database to use for this project, because I am familiar with the application, after using it extensively in my database modules, I had gained a good understanding of it. Also it is accompanied by excellent documentation and support. SQL server is a powerful database with a grate deal of functionality and can deal with a lot of web traffic. But it costs too much for a software licence, $8,487 per server [6], which is not cost effective for a small business.

2.3.1.2 Microsoft Access

Microsoft Access is the best selling database [7], it is included in the Microsoft Office package and both my client and I are familiar with Access. It has the ability to edit, insert,

index and retrieve data through custom made forms and interfaces can also be developed to manipulate the data. It is relatively simple to use with plenty of documentation available. The downside of Access is that it is not ideal for use on a network because it can only cope with a relatively small number of users at a time [7].

2.3.1.3 MySQL

MySQL was developed as an open source piece of software and therefore will cost nothing. It is also a lot faster compared to any other database and the database design is relatively simple [8]. Also it is designed to work well with web-based servers, it is simple to create a web-driven web site and there is a lot of documentation and tutorials available online for help and support. The downside of MySQL is that it not ideal if you want to create an application that demands transactions and foreign key references [8].

2.3.1.4 PostgreSQL

PostgreSQL is another open source database and therefore it will cost nothing to acquire. It supports a grate deal of features like complex rules, triggers, views and even geographical information which some databases will lack [8]. The downside of PostgreSQL is that it is relatively slower than MySQL and the database design is a lot more complex [8]. There is also not as much documentation available compared to the other database applications, and having no prior knowledge of the application, this makes it difficult to learn.

2.3.1.5 Choice of Database

Microsoft Access was chosen to be used for the production of the database for Birkby Videos. I ruled out SQL server because it was not cost effective for a small business and there was little documentation available for a complex DBMS like PostgreSQL. MySQL was ruled out because my client was not familiar with the application and he wanted the ability to easily move the database from one computer to another. Since the website will only be for existing members and Access can concurrently network 255 users [7], the issue of Access only coping with relatively few users compared to the other DBMS will not really be an issue.

2.3.2 Server Side Scripting Language

There are a number of server side scripting languages available for retreving/updating information from the database. ASP, PHP, Perl, ColdFusion and JSP are all possible languages that could have been used.

2.3.2.1 ASP

ASP (Active Server Pages) is a framework by Microsoft that lets you combine scripting languages (VBScript and JavaScript) and software components resulting in very powerful software development [10]. "ASP is a very well supported technology, with all the backing of the Microsoft development community behind it" [10], and there is lots of technical articles and reference material available. However it is not free and it only runs on a Windows server.

2.3.2.2 PHP

PHP is an open source, platform independent scripting language. It is a widely used, general purpose scripting language that is especially suited for web development and can be embedded into HTML [11]. It has an uncomplicated learning curve which results in a more rapid product development [9], and can solve complex problem scenarios quicker and more easily in comparison to other technologies.

2.3.2.3 Perl

Perl is the oldest of the scripting languages. It is a stable, multipurpose, cross platform programming language [12]. It was designed to handle tasks that involve a lot of text manipulation; it is "good at juggling pieces of text from various sources and combining them to form complete documents, which is exactly what is involved in server-side web development" [10]. However, Perl is a complex language and there are simpler languages out there to learn that can do just as much in the web development area.

2.3.2.4 ColdFusion

ColdFusion is designed for web designers with no programming experience, Instead of a scripting language, ColdFusion gives you a set of tags to learn, just like HTML tags, so it is extremely easy to learn/implement [10]. There is plenty of professional support available from its developers (Macromedia) and it has cross platform capabilities. However it costs from $1,299 to $5,999 depending on which edition and subscription are chosen [13].

2.3.2.5 JSP

JSP (JavaServer Pages) is the most powerful platform for server side web development; it is a complex language that provides much functionality and scalability [10]. Due to its complexity it takes a lot of work to learn.

2.3.2.6 Choice of Language

PHP is the server side scripting language that was chosen. It was chosen because it is powerful in web development as it was designed for this purpose. It is a relatively simple language, there is also plenty of documentation and online support available and it costs nothing.

2.3.3 Mark-up Language and Cascading Style Sheets

2.3.3.1 HyperText Markup Language

HTML (HyperText Markup Language) is the universal standard mark-up authoring language, used to create documents on the World Wide Web. HTML defines the structure and layout of a web document by using a variety of tags and attributes.

2.3.3.2 Extensible HyperText Markup Language

XHTML (Extensible HyperText Markup Language) is a mark-up language that has the same expressive possibilities as HTML, but a stricter syntax [20]. It has replaced HTML as the standard mark-up for web documents. XHTML is an application of XML, due to it being a stricter language the content can be delivered to PDA's and other mobile devices. I chose to implement the web site in XHTML.

2.3.3.3 Cascading Style Sheets

CSS (Cascading Style Sheets) is a style sheet language used to describe the presentation of a web page written in a mark-up language (HTML/XHTML). It is used to define the layout, colours and fonts etc. of web pages, therefore the web page content and presentation are separate from each other. Without style sheets all the presentational attributes are contained within the web pages and this would increase the amount of coding, even for simple web pages, CSS allows the user to move the presentational information to the style sheet resulting in considerably simple HTML/XHTML code. I will implement the web site in CSS along with XHTML.

2.3.4 Server

A web server is the place where the web pages exist, it manages requests from a web browser and returns the requested web pages to the client. There are two major web server applications, Apache and ISS (Internet Information Services).

2.3.4.1 ISS

ISS is a Microsoft Windows Web server that allows you to publish information over the internet. It provides a number of benefits, including greater cooperation with the host operating system and easier management and control through a variety of standard tools and utilities compared to the Apache server [14]. ISS is only designed and available to work only within the windows environment. Also there is a major security issue, "with the recent attacks by major viruses, research group Gartner is recommending that enterprises running IIS switch to another, more secure Web server solution" [15].

2.3.4.2 Apache

The Apache Web Serve, unlike Microsoft's IIS Web server is open source and has cross-platform capability. It is now the most widely used web server on the internet [16]. Apache is scalable; it can be configured so that it can be run on a typical home or office PC, to provide access to a small company's web site [16]. The downside of Apache compared to Window's IIS is that it is a lot harder to set up, it requires a lot more configuration and is not as simple as the Add/Remove Windows Components function which is used to add IIS in windows. Even though the server installation is complex, I still chose Apache over IIS because it was open source, it was designed to work with a wide range of languages and "significantly speeds up the execution of dynamic components for languages like PHP, Perl and Python" [14].

2.4 Usability

Usability is extremely important in the development of any system and in particular this project. The user must be able to effectively operate the application and be able to use it to its full potential. If the usability is poor the user will fail to utilise the application to its full extent and this will effectively result in wasting resources.

2.4.1 GOMS

GOMS is an acronym that stands for Goals, Operators, Methods and Selection. A GOMS model is composed of Goals which is what the user wants to achieve, Operators which are the actions the user must take to use the system, Methods which are the different alternative ways to achieve the goal and Selection which is the chosen selection from the different types of methods [21]. GOMS is effective at determining how a user performs a particular task, therefore the developer can create an application where the user doesn't alter the way he/she uses the computer and therefore an application can be created that is simple for the user to learn and adjust to.

Chapter 3

Analysis

3.1 Project Objective

The problem and its possible solutions were discussed with my client; following this discussion a project objective was derived. The project objective was as follows:

> "To produce an appropriate information system according to the business needs. The system will consist of a database which will store details of all the members, DVD titles and be able to carry out all the required operations carried out by the business. The system will also consist of a website which will be linked to the database and members will be able to check their records online."

3.2 Business Needs

It was extremely important that the objectives of this project, stated above met the needs of the business as highlighted in the problem in section 1.2.

3.3 Requirements Capture

A range of different approaches for capturing the user requirements were researched, I decided to adopt the more direct approach and capture the requirements by interviewing the owner of the business, and write a requirement specification.

3.3.1 Interviews/Meetings

The technique used to capture the requirements was through meetings with the owner. At the early stages of the project the meetings were primary used to discussing requirements. Later on in the project when the implementation of the application begun they were also used to demonstrate my current progress, feedback and possible changes required to the application were raised, and the appropriate changes were made to the requirements. This flexibility was ideal as I was adopting the prototyping methodology.

3.3.2 Requirements Specification

In [22] and in many other texts requirements specification are split into two categories, functional requirements and non-functional requirements. Functional requirements define what the end-product of the project is to do, and non-functional requirements are other attributes of the application to be implemented that do not relate so much to what the system is to do but how it is to do it.

The functional and non-functional requirements for Birkby Videos were determined and are stated below. Please note that the requirements stated below are the minimum requirements as well as the additional requirements that were added during the course of the project. The minimum requirements can be seen in section 1.5.

The requirements specifications of the database application are shown below.

Database Application Functional Requirements:

- Rent out a DVD
- Return a DVD
- Show when a DVD is due back
- Add a new DVD title
- Change/Delete a DVD title
- Find a particular DVD by it's DVD number or title
- Show all current DVD's on loan
- Show all DVD's on loan by a particular member
- Show the rental history of a DVD
- Add a new membership
- Cancel/Change a membership
- Find details of a member by their Membership Number/Date of Birth/Name
- Show the rental history of a member
- Add/Delete/Change the members online login details
- Show how many times a DVD title has been rented
- Show how much money a DVD title has made

Database Application Non-Functional Requirements:

- Easy to use and navigate
- A simple and explanatory application
- Not to big or complex

- Interface should remain consistent throughout the application
- The interface should inform the user about what action needs to be taken to carry out an operation

The requirements specifications of the website are shown below.

Website Functional Requirements:

- A home page that contains details about the business
- A contact us page that shows the location of the business, along with contact details
- A page showing the current opening times
- Member login section
- An existing members page that shows them their details
- An existing members page where they can check what DVD's they have on loan and when they are due back
- Update contact details
- Change login password

Website Non-Functional Requirements:

- Easy to use and navigate
- Simple and explanatory
- Use colours that a simple and easy on the eye
- Interface should remain consistent throughout the application
- The interface should inform the user about what action needs to be taken to carry out an operation

3.4 Initial Verses Additional Requirements

As the project progressed, Birkby Videos specified more requirements. The majority of these requirements were further queries to write to the database application.

The minimum requirements are stated in section 1.5. The following enhancements and additions to the requirements were developed.

3.4.1 Database Application

The user can now carry out the following additional operations.

- View the full rental history of any DVD title.
- View the full DVD rental history of any member.

- Add/Delete/Change the members online login details.
- See how many times a DVD has currently been rented.
- See how much money a DVD title has currently made.

Note that a non-technical user manual for the database application was also produced as an additional requirement.

3.4.2 Website

The user can now carry out the following additional operations.

- It came to our attention that an opening times page was needed, because the times varied during the course of the year.
- A contact us page was added that shows the location of the business, along with contact details.
- An existing members page that shows them their details, the business holds.
- Update contact details.
- Change login password.

Chapter 4

Design

4.1 Introduction

This chapter is divided into two main sections. The first section is about the design of the database application and this will be illustrated through an entity relationship diagram and normalisation. The second section is about the design of the website.

4.2 Database

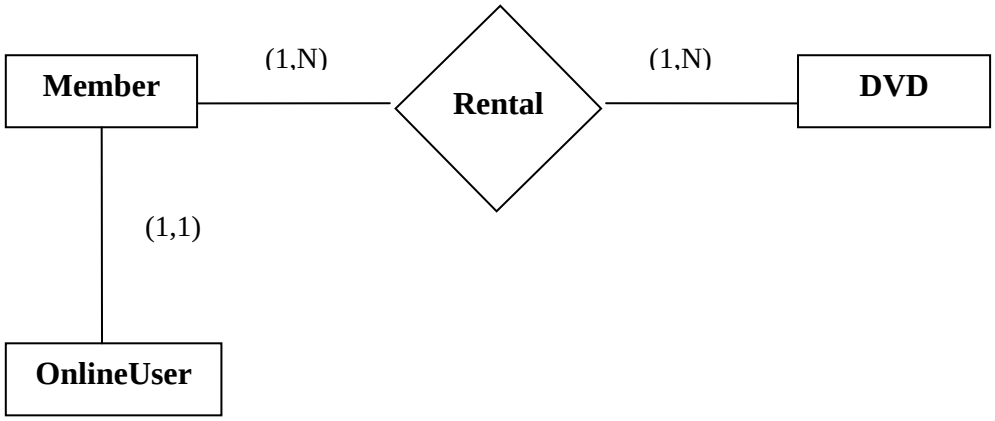
A number of different data modeling techniques were used to obtain the structure of the database application. An entity relationship diagram, which is a graphical representation of the relationships between the entities in the database, this was used to obtain an overall structure of the application. Normalisation was then used to ensure that the structure of the database was accurate by ensuring that there were no data duplication issues.

4.2.1 Entity Relationship Diagram

An entity relational diagram contains three key elements, entities, attributes and relationships. An entity is defined as something "in the real world with an independent existence" [23], this can be either something physical or conceptual. Whereas an attribute has "properties that describes the entities characteristics" [23], for example the properties for the entity Member could be FirstName, Postcode and Email. Finally, entities can be associated with each other via a certain type of relationship. These relationships are split into three types, one-to-one, one-to-many and many-to-many.

A one-to-one relationship is when a single entity is related to another single entity, for example no member has more than one login username and no username is used by more than one member. A one-to-many relationship is when a single entity is related to many instances of another entity, for example a member has many DVD's on loan, but a DVD can only be loaned to one member at a time. Finally, a many-to-many relationship is when many instances of an entity are related to many instances of another entity, for example a DVD title can have more than one category, and that category can be used by many DVD titles.

The diagram below shows the entity relationships for the database application.



4.2.1.1 Explanation of Entity Relationship Diagram

There are four tables shown in the entity relationship diagram above. Three of these tables are related via a one-to-many (1,N) relationship. For instance the Member table has a 1:N relationship with the Rental table, this means that a member can have many DVD's on loan, but a single DVD can only be loaned to one member at a time. The DVD table also has a 1:N relationship with the Rental table. There is a 1:1 relationship between the Member and OnlineUser tables, this means that no member has more than one login username and no username is used by more than one member.

4.2.2 Normalisation

Normalisation is applied on data to ensure that a set of tables in the database are organized efficiently. There are two main goals of normalisation, to eliminate any redundant data, so the same data is not stored in more than one table and to ensure data dependency, by only storing data related to that table. These goals reduce the amount of space a database consumes and ensures that the data is logically stored.

I will normalise my database to third normal form, as this is sufficient for my application and for the business as a whole. The definitions of the first three normal forms taken from [24] are stated below.

First normal form (1NF) sets the very basic rules for an organised database:

- Eliminate duplicative columns from the same table.

- Create separate tables for each group of related data and identify each row with a unique column or set of columns (the primary key).

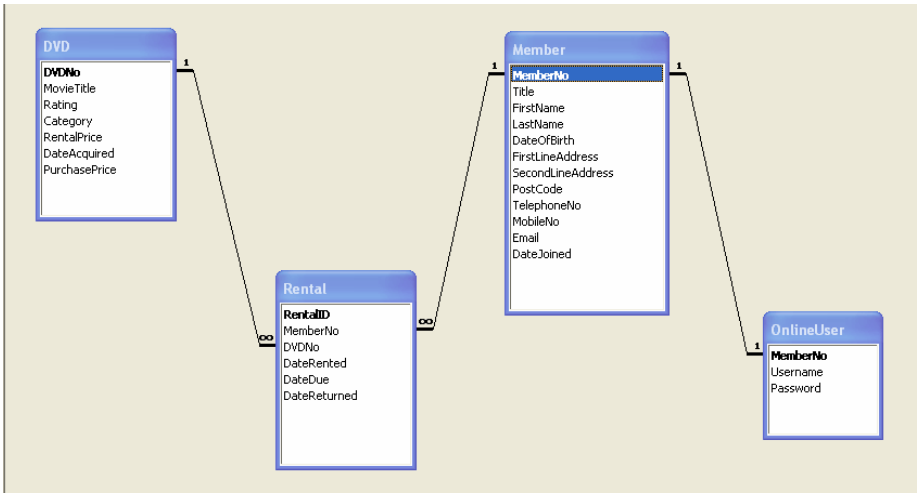
Second normal form (2NF) further addresses the concept of removing duplicative data:

- Meet all the requirements of the first normal form.
- Remove subsets of data that apply to multiple rows of a table and place them in separate tables.
- Create relationships between these new tables and their predecessors through the use of foreign keys.

Third normal form (3NF) goes one large step further:

- Meet all the requirements of the second normal form.
- Remove columns that are not dependent upon the primary key.

The database tables for the Birkby Videos application is in 3NF (third normal form), the normalised tables along with their entity relationships are shown below.



4.2.2.1 Data Definition Tables of Normalised Database

Below are the data definition tables of the database.

ONLINE USER

Attribute Name	Data Type	Description
MemberNo	Integer	The membership number. Primary Key.
Username	Text	Online username.

Password	Text	Online password.

MEMBER

Attribute Name	Data Type	Description
MemberNo	Integer	The membership number. Primary Key.
Title	Text	The member's title.
FirstName	Text	Member's first name.
LastName	Text	Member's last name.
DateOfBirth	Date/Time	Member's date of birth.
FirstLineAddress	Text	Member's first line of address.
SecondLineAddress	Text	Member's second line of address.
PostCode	Text	Member's post code.
TelephoneNo	Text	Member's telephone number.
MobileNo	Text	Member's mobile number.
Email	Text	Member's email address.
DateJoined	Date/Time	The date the member joined.

DVD

Attribute Name	Data Type	Description
DVDNo	Integer	The DVD number. Primary Key.
MovieTitle	Text	Title of the DVD.
Rating	Text	Rating of the DVD.
Category	Text	Category of the DVD.
RentalPrice	Currency	Rental price of the DVD.
DataAcquired	Date/Time	Date the DVD was acquired.
PurchasePrice	Currency	Purchase price of the DVD.

RENTAL

Attribute Name	Data Type	Description
RentalID	AutoNumber	The rental identification number. Primary Key.
MemberNo	Integer	The membership number. Foreign Key.

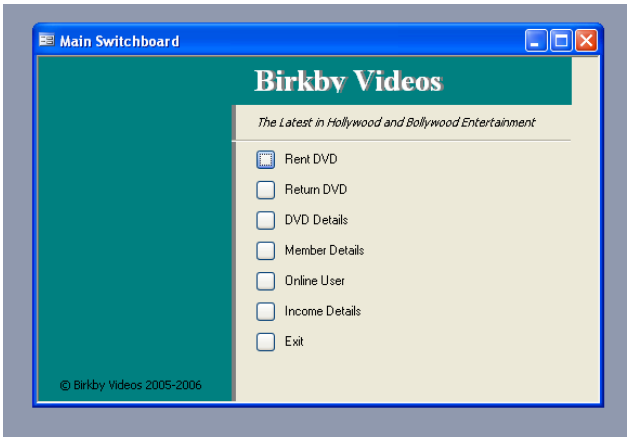
DVDNo	Integer	The DVD number. Foreign Key.
DateRented	Date/Time	Date the DVD was rented.
DateDue	Date/Time	Date the DVD is/was due back.
DateReturned	Date/Time	Date the DVD was returned.

4.2.3 Graphical User Interface

Using Microsoft Access for the application was a grate advantage when it came to creating the graphical user interface; this was because it offered a swift and easy solution to creating the interface, without the need of any programming. I took advantage of its various tools to create an interface that met the user requirements, and when it came to making changes to the interface, it was a simple process without the need of much extra work.

When considering the design of the user interface, functionality and usability of the application were the two most important issues. The aim was to create an interface that was self explanatory, easy to use and navigate, and the interface remained consistent throughout, as stated in the requirements in section 3.3.2.

The Main Menu of the database application is shown below.

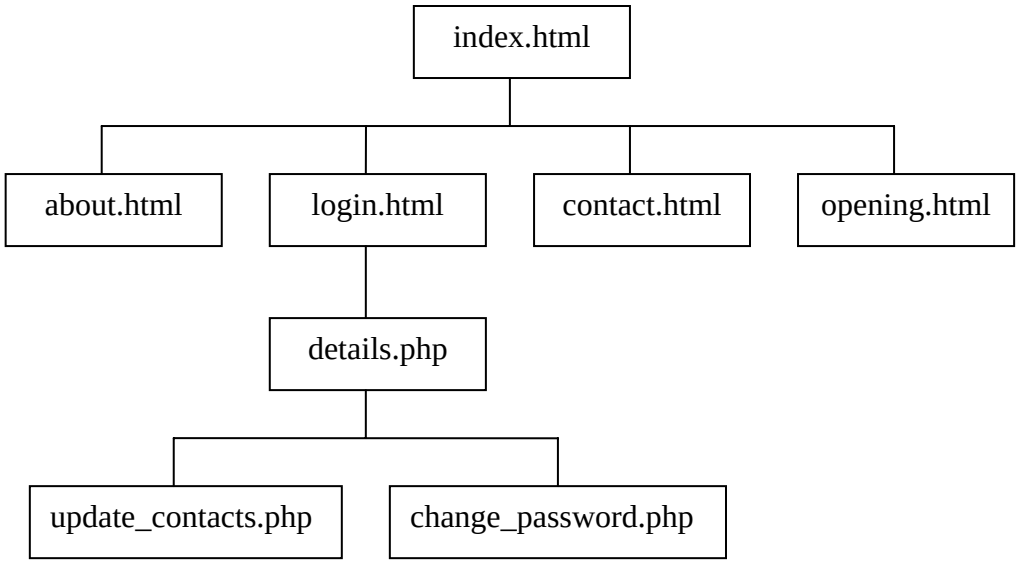


4.3 Website

The next stage was to design the website, its interface and layout. It was an important factor in the development process.

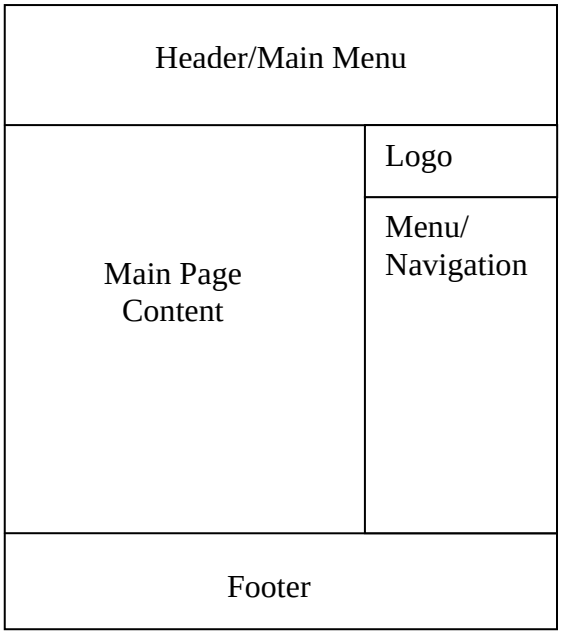
4.3.1 Website Framework

The diagram below shows the site structure. It shows the relationship between the web pages and how they will link to each other.



4.3.2 Page Layout

In terms of the physical layout, each page will have a header, which will contain the menu options and footer, and in between this the main content of the page will reside. To the left of the main page content there will be a menu column. A diagram to illustrate this is shown below.



This is a very simple layout, and it will therefore enable the user to navigate easily through the site and every operation carried out by the user should be self explanatory. This will ensure that the user has a pleasant and user friendly experience when visiting the web site.

4.3.3 Look and Feel

Sharply contrasting and deep colours were avoided, so I opted for a soft green with plenty of white space as the colour combination. Incorporated with this was dark text on the white background, this was used to display the majority of the site content. This was used for clarity and also fitted in well with the selected colour scheme. I made as much use of the white space as possible, as white space helps keep the page looking clean and is easy on the eye, whilst also improving readability. This colour combination will not divert the user's attention and will ensure a pleasant user friendly experience.

Only a limited number of images were used, and when they have been used, they have been to aid the design. This was done to ensure its simplicity.

To ensure usability I ordered the menu options according to importance/relevance, this is what most of the users would expect and be comfortable with. By also incorporating the menu navigation into the header of every page, this ensured the usability of the website to its highest level.

Chapter 5

Implementation

5.1 Introduction

Implementation was the next process in the project development phase. The database application was created first, followed by the website. These were then integrated with the dynamic aspect, and resulting in the full system.

5.2 The System

The full system was implemented on my laptop computer; it was running Microsoft Windows XP Professional SP2. The Apache 2.0.55 server and the scripting language PHP 4.4.1 were installed on the computer.

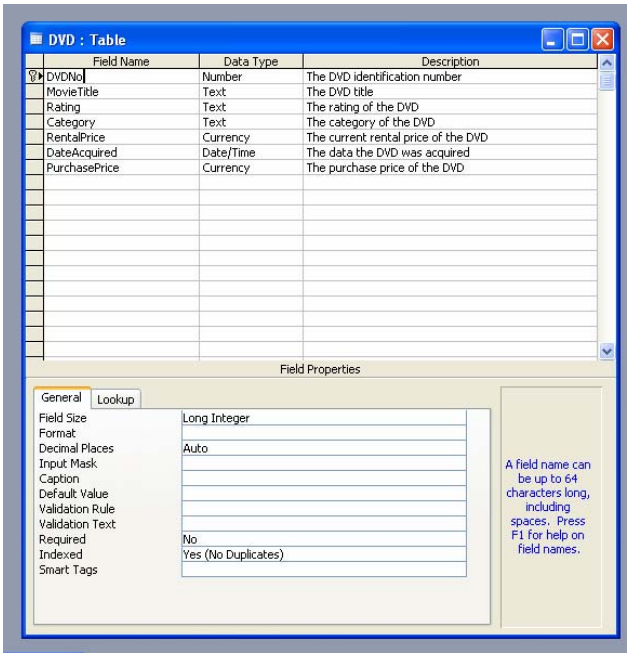
5.3 ODBC Connection

Before I could begin implementation I had to setup an ODBC (Open Database Connectivity) connection on my laptop. This was a connection between the Microsoft Access Database and the PHP scripts, to ensure connectively between the database and the website. The tutorial [25] was followed to setup this connection, and it was a quick and simple process.

5.4 Database Implementation

The tables that were proposed in the design chapter were created in the Access database, with the correct data types, this was a relatively simple process in Access as it had a wizard to carry out this step, which was simple and self explanatory, this ensured this process was carried out quickly and simply. I ensured that the tables had the correct entity relationships between them.

Details of one of the implemented tables are shown over the page.



5.4.1 Database Queries

Once the tables had been implemented, I had to create the database queries for the application this was the most time consuming process and some of the queries were quite difficult to implement, and they required further understanding of Access/SQL. Below are the queries I created for the database application.

All DVD's currently on loan, to which member and when they are due back

SELECT Rental.RentalID, Rental.MemberNo, Rental.DVDNo, Rental.DateRented, Rental.DateDue, Rental.DateReturned
FROM Rental WHERE (((Rental.DateReturned) Is Null));

Complete rental history of every member

SELECT Member.MemberNo, Member.FirstName, Member.LastName, Rental.DVDNo, Rental.DateRented, Rental.DateDue, Rental.DateReturned
FROM Member INNER JOIN Rental ON Member.MemberNo = Rental.MemberNo;

DVD's on loan by a member

SELECT Rental.MemberNo, Rental.DVDNo, DVD.MovieTitle, Rental.DateRented, Rental.DateDue
FROM DVD INNER JOIN Rental ON DVD.DVDNo=Rental.DVDNo
WHERE (((Rental.MemberNo)=[Enter Member No:]) AND ((Rental.DateReturned) Is Null));

Rental history of a DVD

SELECT Rental.DVDNo, DVD.MovieTitle, Rental.MemberNo, Rental.DateRented, Rental.DateReturned
FROM DVD INNER JOIN Rental ON DVD.DVDNo=Rental.DVDNo
WHERE (((Rental.DVDNo)=[Enter DVD No:]))
ORDER BY Rental.DateRented;

Rental history of a member

SELECT MemberHistoryOfDVDs.MemberNo, MemberHistoryOfDVDs.FirstName, MemberHistoryOfDVDs.LastName, MemberHistoryOfDVDs.DVDNo, MemberHistoryOfDVDs.DateRented, MemberHistoryOfDVDs.DateDue, MemberHistoryOfDVDs.DateReturned
FROM MemberHistoryOfDVDs
WHERE (((MemberHistoryOfDVDs.MemberNo)=[Enter Member No:]));

Total bill amount of every rental

SELECT Rental.RentalID, Rental.MemberNo, Rental.DVDNo, Rental.DateRented, Rental.DateDue, Rental.DateReturned, DVD.RentalPrice, IIf(([DateReturned]-[DateRented]=0),[RentalPrice],(([DateReturned]-[DateRented])[RentalPrice])) AS BillAmount*
FROM DVD INNER JOIN Rental ON DVD.DVDNo=Rental.DVDNo;

Total income along with how many times every DVD has been rented

SELECT DISTINCTROW DVD.DVDNo, DVD.MovieTitle, DVD.Rating, DVD.Category, DVD.RentalPrice, DVD.DateAcquired, DVD.PurchasePrice, Sum(TotalBillAmount.BillAmount) AS TotalIncome, Count(*) AS NoOfTimesRented
FROM DVD INNER JOIN TotalBillAmount ON DVD.DVDNo = TotalBillAmount.DVDNo
GROUP BY DVD.DVDNo, DVD.MovieTitle, DVD.Rating, DVD.Category, DVD.RentalPrice, DVD.DateAcquired, DVD.PurchasePrice;

Total income along with how many times a particular DVD has been rented

SELECT TotalIncome.DVDNo, TotalIncome.MovieTitle, TotalIncome.Rating, TotalIncome.Category, TotalIncome.RentalPrice, TotalIncome.DateAcquired, TotalIncome.PurchasePrice, TotalIncome.TotalIncome, TotalIncome.NoOfTimesRented
FROM TotalIncome
WHERE (((TotalIncome.DVDNo)=[Enter DVD No:]));

Find DVD by its identification number

SELECT DVD.DVDNo, DVD.MovieTitle, DVD.Rating, DVD.Category, DVD.RentalPrice
FROM DVD
WHERE (((DVD.DVDNo)=[Enter DVD No:]));

Find DVD by its title

SELECT DVD.DVDNo, DVD.MovieTitle, DVD.Rating, DVD.Category, DVD.RentalPrice
FROM DVD
WHERE (((DVD.MovieTitle)=[Enter DVD title:]));

Find member by their date of birth

SELECT Member.MemberNo, Member.Title, Member.FirstName, Member.LastName,
Member.DateOfBirth, Member.FirstLineAddress, Member.SecondLineAddress,
Member.PostCode, Member.TelephoneNo, Member.MobileNo, Member.Email,
Member.DateJoined
FROM Member
WHERE (((Member.DateOfBirth)=[Enter Date of Birth:]));

Find member by their name

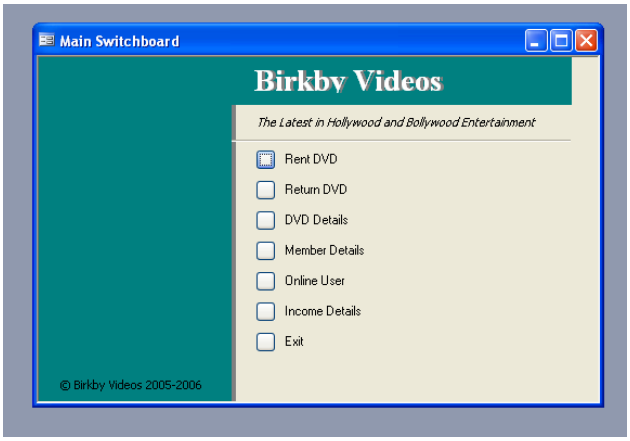
SELECT Member.MemberNo, Member.Title, Member.FirstName, Member.LastName,
Member.DateOfBirth, Member.FirstLineAddress, Member.SecondLineAddress,
Member.PostCode, Member.TelephoneNo, Member.MobileNo, Member.Email,
Member.DateJoined
FROM Member
WHERE (((Member.FirstName)=[Enter First Name:]) AND ((Member.LastName)=[Enter Last Name:]));

Find member by their membership number

SELECT Member.MemberNo, Member.Title, Member.FirstName, Member.LastName,
Member.DateOfBirth, Member.FirstLineAddress, Member.SecondLineAddress,
Member.PostCode, Member.TelephoneNo, Member.MobileNo, Member.Email,
Member.DateJoined
FROM Member
WHERE (((Member.MemberNo)=[Enter Member No:]));

5.4.2 Graphical User Interface

Once the queries had been created it was time to create the graphical user interface as discussed in section 4.2.3, and incorporate the queries I created earlier. Again this was a simple and self explanatory process; this is one of the big advantages of using Microsoft Access to create the application. The main menu of the database application is shown below.



The applications user interface met all the user requirements in terms of its usability and simplicity.

The approach taken towards the implementation of the database application followed the over project methodology.

5.5 Website Implementation

It was now time to implement the website. The approach taken towards the scripting of the PHP server side files and the client side XHTML/CSS also followed the overall project methodology.

5.5.1 CSS and XHTML

The look and feel aspects of the website were handled by the combination of a cascading style sheet and XHTML. The research done into usability and design was followed exactly when it came to implementing the CSS and XHTML, along with the user requirements that are stated in section 3.3.2.

Despite the fact I had no prior knowledge of CSS, I still decided to adopt this. This was due to the research I had done, and it had stated that without CSS all the presentational attributes are contained within the web pages and this would increase the amount of coding, even for

simple web pages, CSS allowed me to move the presentational information to the style sheets and this resulted in considerably simple XHTML code.

Ever though both XHTML and CSS were new to me, this did not create me any problems because they were relatively simple to learn and implement, and when I did come across any problems there was plenty of help available from textbooks and the internet.

The CSS and XHTML coding was done in the Notepad text editor.

Div elements were used for the main page layout, and were implemented according to the page design in section 4.3.2. The look and feel was implemented according to section 4.3.3. Screenshots of the web pages can be seen in Appendix C.

5.5.2 Static Web Pages

The static web pages that were created were as follows.

index.html was the home page and contained some information about the business and the website.

about.html contained information about what the business was about.

login.html was the login page, were existing members of the business would use to login and view their details.

contact.html contained the businesses contact details, along with its location.

opening.html contained the current opening times of the business.

These pages can be seen in Appendix C.

5.5.3 PHP

The coding of the PHP scripts was the most important part of the implementation, as this was the chosen language for the database connection and manipulation. This was important in the functionality of the website and the overall outcome of the system.

PHP was a new language to me, so before any implementation could begin I had to familiarise my self with the language and its syntax. Two PHP books [26] and [27] were studied before the implementation stated, they were also used during the implementation process as reference.

Further help and tutorials were available on the internet, www.php.net and www.phpfreaks.com, two particularly good sites, and were very useful when I came across any problems and guided me in the right direction.

The PHP scripts were initially written separately from the CSS and XHTML, and incorporated later on. I took this approach because I wanted to ensure functionality first and worry about the output later; incorporating the PHP into the XHTML was a fairly simple task.

5.5.3.1 Connection Script

odbc.php was the connection script written to provide a connection between the database and the website. The script is shown below:

```
<?php
$odbc = odbc_connect ('BirkbyDB', 'root', '') or die('Could    Not Connect to ODBC Database!');
?>
```

This script establishes an ODBC connection between the database and the website, and displays an error messages if the connection fails. In all of the PHP scripts I implemented, before the website could retrieve or manipulate any data from the database, the *odbc.php* script was called so a connection could be established.

5.5.3.2 PHP Scripts

check_login.php script checks that the username and password entered by the user matches the ones stored in the database, if they do match the login is successful and this is displayed on the web page, and if they do not match the appropriate message is displayed. It also checks to ensure that the user has not missed entering their username or password.

details.php displays the members current personal details the business holds, along with what DVD's the member has on loan and states when they are due back.

update_contacts.php is a web page were the member that is logged in can change/update their contact details via the web page. The current contact details that are stored in the database are displayed on the web page, and a form is provided to insert their new contact details.

process_contacts.php script sends the changed/updated contact details to the database, which is then subsequently updated, and displays a message telling the user weather the process has been successful or not.

change_password.php is a web page were the member that is logged in can change their login password via the web page. The member must enter their old password, their new password and confirm their new password in the form on the web page.

process_password.php script processes the details entered in the change password form, and sends the new password to the database, which is then subsequently updated, and displays a message telling the user weather the process has been successful or not. It throws up an error message if any of the fields have not been completed, or if the old password does not match the one in the database, or if the new passwords entered do not match.

logout.php script logs out the current user, and return the user to the home page.

The PHP code of some of these scripts is shown in Appendix D.

5.6 Prototyping

I chose to adopt the Prototyping methodology for the development of this project, so in the implementation phase of the development process a number of changes were made during the course of the phase, after demonstrating my progress to my client. It allowed my client to have an active involvement in the development of the system and ensured that the final system met his needs.

I demonstrated the system to my client on four separate occasions, appropriate changes were made and further functionality was added.

Below are some brief details of the changes that were made to the database application and website during the course of the implementation of the system, by adopting the prototyping methodology.

5.6.1 Database Application

- Change the colour scheme of the application from white/black to green/gray.
- Align the buttons of the application vertically instead of being clustered.
- Enable the user to view the full rental history of any DVD title.
- Enable the user to view the full DVD rental history of any member.
- Enable the user to Add/Delete/Change the members online login details.
- Enable the user to see how many times a DVD has currently been rented.
- Enable the user to see how much money a particular DVD title has currently made.

5.6.2 Website

- Add a web page for the opening times of the business, because the opening times varied during the course of the year.
- Add a web page that contains the contact details of the business, along with the location of the premises.
- Enable the existing member that is logged on to view their personal details the business holds, so if there are any incorrect information the member can get it changed.
- Enable the member to update their contact details online.
- Enable the member to change their login password online.
- There were some layout issues of the content of some of the web pages, and these were resolved.

5.7 Security

Security was not really an issue when implementing the system. This was due to the fact that Birkby Videos did not carry out any electronic transactions (i.e. credit/debit card), and no private or confidential details were stored on the system. All business transactions were cash only, and therefore security was not an issue.

Chapter 6

Testing

6.1 Introduction

As mentioned previously the methodology I adopted was flexible, and the phases were not clear cut. The testing of the database application, PHP scripts and the web pages started during the implementation phase. As a section of the application was completed or some code was written, tests were designed and implemented during the system implementation process, this was done so error/mistakes could be corrected in the implementation phase. Once the system was complete further testing was carried out to test the final system.

6.2 Unit Testing

Unit testing was undertaken during the implementation phase of the development. When ever a part of the database application, PHP scripts or web pages was completed, they were individually tested for any errors before they were merged into the system as a whole. It was important to test early on in the development and consistently, so error could be detected and eliminated early on. This would ensure that the system as a whole contained little or no errors.

This method of testing proved to be very effective in discovering minor trivial errors, which were easily fixed before it created further more complicated problems, later on down the line in the development process.

6.3 Functional Testing

The testing approach here was to work through the entire database application and website, and test the input and output of the system, making sure everything behaved as expected. Below is the test plan along with its results for the database application and the website.

6.3.1 Database Application

Application Area	Description	Success?
Main Menu	All seven buttons in the menu take you to the correct location.	YES
	The exit button exits the application.	YES
Rent DVD	Filling in the form fields correctly updates the database.	YES
	'Rent DVD' button updates the database and clears the form fields.	YES
	The exit button exits the form.	YES
Return DVD	Filling in the 'date returned' field correctly updates the database.	YES
	'Find DVD No' button launches the search window.	YES
	The exit button exits the form.	YES
DVD Details Menu	All eight buttons in the menu take you to the correct location or launch the appropriate forms.	YES
Add New DVD Title	Filling in the form fields correctly updates the database.	YES
	The delete button deletes the correct record from the database.	YES
	Add new record button clears all the form fields.	YES
	The find record button launches the search window.	YES
	The exit button exits the form.	YES
Change/Delete DVD Title	Filling in the form fields correctly updates the database.	YES
	The delete button deletes the correct record from the database.	YES
	Add new record button clears all the form fields.	YES
	The find record button launches the search window.	YES
	The exit button exits the form.	YES
Find DVD by Number	The enter DVD number window pops up.	YES

	Displays the correct DVD details.	YES
Find DVD by Title	The enter DVD title window pops up.	YES
	Displays the correct DVD details.	YES
All Current DVDs on Loan	Correctly display all the current DVDs that are out on loan.	YES
DVDs on Loan by Member	The enter membership number windows pops up.	YES
	Correctly displays all the DVD's the member has out on loan.	YES
Rental History	The enter DVD number window pops up.	YES
	Correctly displays the rental history of that DVD.	YES
Member Details Menu	All seven buttons in the menu take you to the correct location or launch the appropriate forms.	YES
Add New Member	Filling in the form fields correctly updates the database.	YES
	The delete button deletes the correct record from the database.	YES
	Add new record button clears all the form fields.	YES
	The find record button launches the search window.	YES
	The exit button exits the form.	YES
Change/Cancel a Membership	Filling in the form fields correctly updates the database.	YES
	The delete button deletes the correct record from the database.	YES
	Add new record button clears all the form fields.	YES
	The find record button launches the search window.	YES
	The exit button exits the form.	YES
Find Details by Membership No	The enter membership number window pops up.	YES
	Displays the correct details of the member.	YES
Find Details by Date of Birth	The enter date of birth window pops up.	YES
	Displays the correct details of the member.	YES
Find Details by Name	The enter name windows pops up.	YES
	Displays the correct details of the member.	YES

Members Rental History	The enter membership number window pops up.	YES
	Correctly displays the rental history of that member.	YES
Online User	Filling in the form fields correctly updates the database.	YES
	The delete button deletes the correct record from the database.	YES
	Add new record button clears all the form fields.	YES
	The find record button launches the search window.	YES
	The exit button exits the form.	YES
Income Details	All three buttons in the menu take you to the correct location or launch the appropriate forms.	YES
Details of all DVDs	Correctly displays the income details of all the DVDs.	YES
Details of a DVD	The enter DVD number window pops up.	YES
	Displays the correct income details of the DVD.	YES

6.3.2 Website

Web Page	Description	Success?
index.html	Correctly displays its content.	YES
about.html	Correctly displays its content.	YES
log.html	Correctly displays its content.	YES
	The login operation correctly works.	YES
contact.html	Correctly displays its content.	YES
opening.html	Correctly displays its content.	YES
check_login.php	Correctly displays its content.	YES
	Login failed message appears, if you do not enter the username.	YES
	Login failed message appears, if you do not enter the	YES

	password.	
	Login failed message appears, if the username or password are incorrect.	YES
	Login successful message appears, if the username or password is correct.	YES
details.php	Correctly displays its content.	YES
	Displays the logged in user's correct details and the correct DVDs that are due back.	YES
update_contacts.php	Correctly displays its content.	YES
	Displays the logged in users correct contact details.	YES
process_contacts.php	Correctly displays its content.	YES
	Update failed message appears, if the telephone was not entered.	YES
	Update successful message appears, if the update was a success.	YES
change_password.php	Correctly displays its content.	YES
	Displays the logged in users username.	YES
process_password.php	Correctly displays its content.	YES
	Change password failed message appears, if you do not enter the old password.	YES
	Change password failed message appears, if you do not enter the new password.	YES
	Change password failed message appears, if you do not confirm the new password.	YES
	Change password failed message appears, if the new password and its confirmation do not match.	YES
	Change password failed message appears, if the old passwords do not match.	YES
	Password change successful message appears, if the update was a success.	

logout.php	Logs the user out and returns them to the home page.	YES

6.4 Browser Compatibility

It was important to test the system on different web browsers to ensure its compatibility, and that the website was available to all of the Birkby Videos members. The website was tested on three of the top browsers, which accounted for well over 90% of the internet users. The results are shown below.

Browser	Results
Internet Explorer	Works correctly
Mozilla Firefox	Works correctly
Netscape Navigator	Works correctly

It can be seen from the results above that the website was compatible with all the browsers.

Chapter 7

Evaluation

7.1 Goals and Requirements

Determining weather the system met the original goals and requirements was extremely important, as this was the whole aim of this project. The minimum requirements are stated in section 1.5 and they were all met. The minimum requirements were exceeded and the addition work that was carried out is stated in sections 1.6 and 3.4.

Both the database application and website were implemented according to the analysis and design sections. Any additional needs and requirements that came up in the implementation phase of the project were carried out. The whole structure of the system remained as originally planned, just further functionality was added to both the database application and the website. Overall the system met its goals and requirements, and exceeded them by a substantial amount.

7.2 Usability

To evaluate the usability of the whole system, the process was split into two phases. The website was evaluated by ten customers/members of Birkby Videos, as they were the potential users of the website. This was carried out randomly at the business premises, during its opening hours. The database application was evaluated by the client, as he was the eventual end user of this application and this was appropriate. Questionnaires were prepared for both the evaluation of the website and database application.

7.2.1 Website

The results of the questionnaire are shown in the table below; the numbers indicate the number of users who ticked that box.

Question	Excellent	Above Average	Average	Below Average	Poor
How was it to navigate around the site?	**8**	**2**	**0**	**0**	**0**
What do you think of the colour scheme?	**5**	**4**	**1**	**.0**	**0**
How was it to find the content you were looking for?	**6**	**3**	**1**	**0**	**0**
Was the language clear and understandable?	**7**	**1**	**2**	**0**	**0**
How was the overall layout and design of the site?	**6**	**4**	**0**	**0**	**0**
Was all the content appropriate?	**8**	**2**	**0**	**0**	**0**
How was the layout of the 'Your Details' page?	**4**	**4**	**2**	**0**	**0**
How was the design and layout of the forms in the website?	**5**	**5**	**0**	**0**	**0**

The most positive thing about the site.	There were a variety of different answers to this, but the most common answer was that the layout was nice and simple, and the site was easy to navigate.
The most negative thing about the site.	Again there were a variety of answers, but a number of users said that their were no external links to other movie related sites.
State any suggestions of improvements.	Users recommended having the DVD's currently in stock on the website, along with users able to reserve DVD's online.

The eventual evaluators were chosen completely at random as they came into the business promises. It can be seen from the results that the users seem to be happy with the websites presentation, layout and its simple navigation; this is what was aimed from the outset of this development. There was no 'below average' or 'poor' boxes ticked by the evaluators. The improvement suggestions by the evaluators were considered for further development.

7.2.2 Database Application

The answers to the client's questionnaire are shown below for the database application.

Question	Excellent	Above Average	Average	Below Average	Poor
How was it to navigate around the application?	**X**				
How was the presentation and layout?	**X**				
Was the language clear and understandable?	**X**				
How was the design and layout of the application forms?	**X**				
Were all the application buttons appropriate?	**X**				
Was all the content appropriate?	**X**				
What do you think of the colour scheme and design of the application?		**X**			

It can be seen from the results that the client was very happy with the applications presentation, layout and its navigation; again this was something that was aimed for from the outset of this development. The client ticked the 'excellent' box in all the sections, except one which was the 'above average' box.

7.3 Limitations

There were no real major limitations during the course of the project, but there was one limitation that was identified during the evaluation phase.

It was realised that the output of the tables in the database application could have been more efficient. Instead of them appearing in a separate window, they could have been integrated to the same window. This could have been resolved if there had been more time, and it is an issue of further development later on.

7.4 Methodology and Schedule

The use of the prototyping methodology ensured that the evaluation of the system was carried out throughout the development process, rather than just the end and the results were used to make the required changes. This also ensured that the system was constantly assessed, therefore the problems were corrected at the time and little or no errors were found in the testing/evaluation stages.

Another advantage of adopting this methodology was that the user was actively involved in the development from the very beginning. Therefore my client had a direct influence on how the whole system was created, this was an important factor as the system was being created for him and he was the eventual end user.

It was the correct decision to adopt the prototyping methodology, as the development was a success and a system was created that met users needs and requirements. Had this methodology not been chosen the client would only had the minimal of input into the development and the necessary iterative stages would not have been accomplished.

The planned and actual schedules can be seen in Appendix B. The initial schedule underestimated the time required for the background research and implementation; it nearly took twice as much time as originally planned. This was due to the fact that both PHP and CSS were new languages to me and lots of time was spent learning the languages, I did not initially plan this. Overall this was not really an issue as the schedule was quite flexible and it did not affect the outcome or delay the progress.

7.5 Further Development

There are a number of further developments that can be carried out. The client suggested having the whole DVD database online, so members can view all the DVD's that are in stock from the website.

Another thing the client suggested was to create some sort of message board were the members can leave feedback/reviews of the DVD's they have rented. A reservation system can also be created were the member can reserve particular DVD's online and collect them from the store later. Birkby Videos is only a small local business, that's why these suggestions were not requirements at the beginning of the project, and they can be developed later on down the line.

The suggestions made by the users in section 7.2.1 can also be implemented later. Other developments can be made as the business grows, there will probably come a time when the business starts to take electronic transactions, and the database application may need to be updated to accommodate this. As the business grows I am sure there will become a need for extra functionary to both the database application and the website.

7.6 Conclusion

The final system that was created met my client's requirements, and the client was pleased with the outcome. After a trial period he hopes to adopt the system and use it for his everyday running of his business.

The system has the desired functionality and much more. Overall it was a success, and achieved what it set out to achieve.

Bibliography

[1] B. Hughes and M. Cotterell, Software Project Management, Third Edition, 2002, McGraw-Hill

[2] J. Cadle and D. Yeates, Project Management for Information Systems, Fourth Edition, 2004, Prentice Hall

[3] Waterfall model – Wikipedia, Retrieved November 2005
http://en.wikipedia.org/wiki/Waterfall_Model

[4] spiral_model.gif, Retrieved November 2005
http://www.elanman.org/teaching/gmu/swe620-infs622/Graphics/spiral_model.gif

[5] The ITSC System Development Methodology Guidebook, Retrieved November 2005
http://www.itsc.org/PDF/M-3_ITSC_Sys_Dev_Meth_Guide.pdf

[6] Microsoft SQL Server: How to Buy, Retrieved November 2005
http://www.microsoft.com/sql/howtobuy/default.mspx

[7] Benefits and Constraints of using Microsoft Access Database, Retrieved November 2005
http://www.galleryimage.com.au/Why-Access-Database.htm

[8] MySQL vs. PostgreSQL, Retrieved November 2005
http://builder.com.com/5100-6388_14-1050671.html

[9] N. Gray, Web Server Programming, 2003, Wiley

[10] Which Server-Side Language Is Right For You?, Retrieved November 2005
http://www.sitepoint.com/article/server-side-language-right

[11] PHP: Hypertext Preprocessor, Retrieved November 2005
http://www.php.net/

[12] The Perl Directory – perl.org, Retrieved November 2005
http://www.perl.org/

[13] Macromedia - ColdFusion MX 7, Retrieved November 2005
http://www.macromedia.com/software/coldfusion/buy/

[14] IS vs. Apache, Looking Beyond the Rhetoric, Retrieved December 2005
http://www.serverwatch.com/tutorials/article.php/3074841

[15] Time to Switch from IIS, Retrieved December 2005
http://webdesign.about.com/cs/webservers/a/aa092501a.htm

[16] The Apache HTTP Server Project, Retrieved December 2005
http://httpd.apache.org/

[17] S. McConnell, Rapid Development, 1996, Microsoft

[18] J. Bareham, Web Based Timetabling Aid, 2005, University of Leeds

[19] A. Gabbay, A Database web solution for a property company, 2005, University of Leeds

[20] XHTML, Retrieved January 2006
http://en.wikipedia.org/wiki/XHTML

[21] A. Dix, G. A bowd, R. Beale, Human Computer Interaction, Second Edition, Prentice Hall

[22] S. Robertson, J. Robertson, Mastering the Requirements Process, 1999, Addison-Wesley

[23] R. Elmasri, S. Navathe, Fundamentals of Database Systems, Third Edition, Addison-Wesley

[24] Database Normalization Basics, Retrieved December 2005
http://databases.about.com/od/specificproducts/a/normalization.htm

[25] Microsoft Access Database, ODBC and PHP, Retrieved December 2005
http://www.phpfreaks.com/tutorials/61/0.php

[26] T. Ratschiller, T. Gerken, Web Application Development with PHP 4.0, 2000, Sams

[27] M. Zandstra, Teach Yourself PHP in 24 Hours, Second Edition, Sams

Appendix A: Reflection

Overall the whole final year project experience was useful and at times enjoyable. Upon entering the final year project I was quite nervous, as I had never undertaken a project of this scale before, and on top of that I had never built any sort of web based system. So when the project started I felt I had a mountain to climb, and I did not know where to begin. It took some time for reality to sink in and realise that I had a project to do, and I should just get on with it.

I had a 40-40 module slit, and this was a worry due to my delayed start, as I would have a lot of work to do in the second semester and the module workload was the same. I would recommend to anyone doing a final year project to have a 50-30 split in the modules because the vast majority of the project work is done in the second semester, and this would ease some of the workload.

I found the whole project experience rewarding as I was creating a system for an actual business and eventual it was going to aid the running of the business. This gave me the extra motivation to work hard and get on with the task in hand.

The advice I would give to a final year student is that choosing the right methodology is extremely important when carrying out a development like this, if I had not chosen the current methodology the project would not have been a success, so you must have a methodology when creating a system.

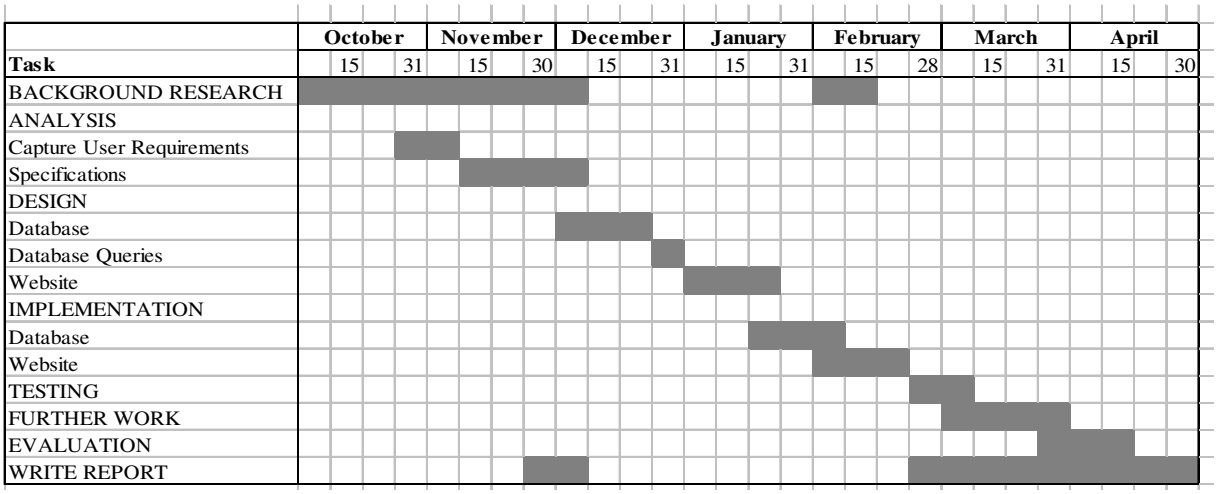
Another important thing in project development is time management, your time should be carefully planned and adequate time should be left at the end for any possible delays. Time management was my weakness, if I had to do the project again I would certainly mange my time in a more efficient way, and would make a strict attempt to sticking to the schedule.

Another weakness was that I underestimated the time requited to write up the final report; I would advice future students to leave ample time for the final write up as it takes a lot of work and longer than you anticipate.

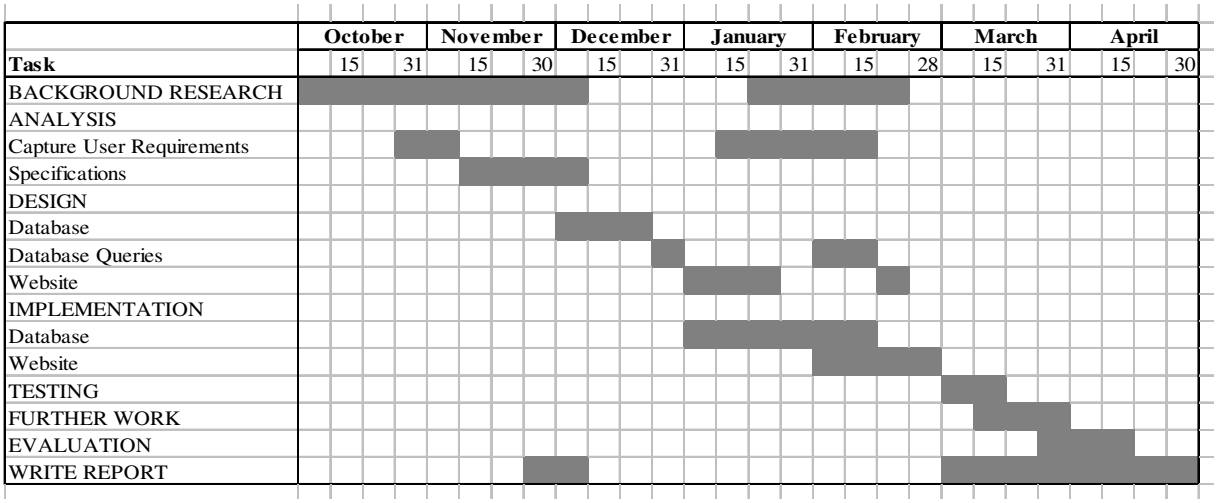
I have come out of this project with many new practical skills, such as learning and implementing a new scripting language in limited time, and designing and implementing a web based system, I know these skills will be useful for me in the future.

Appendix B: Project Schedule

PLANNED SCHEDULE



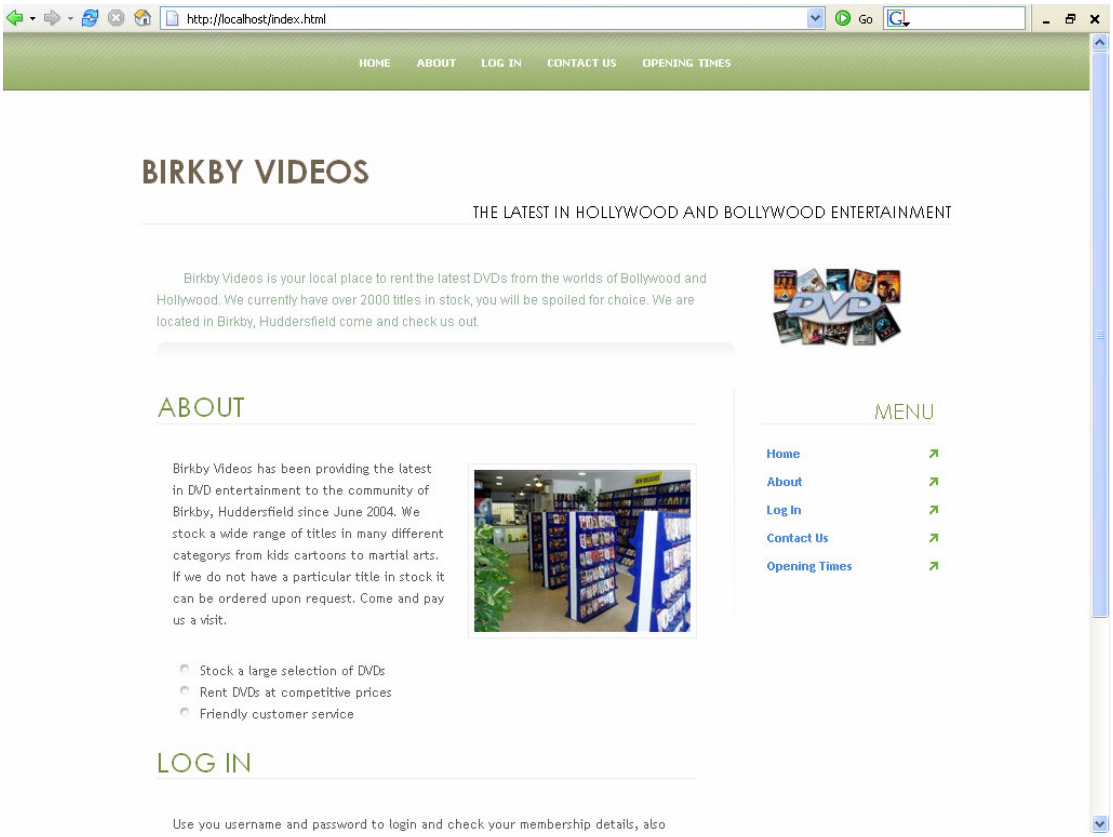
ACTUAL SCHEDULE



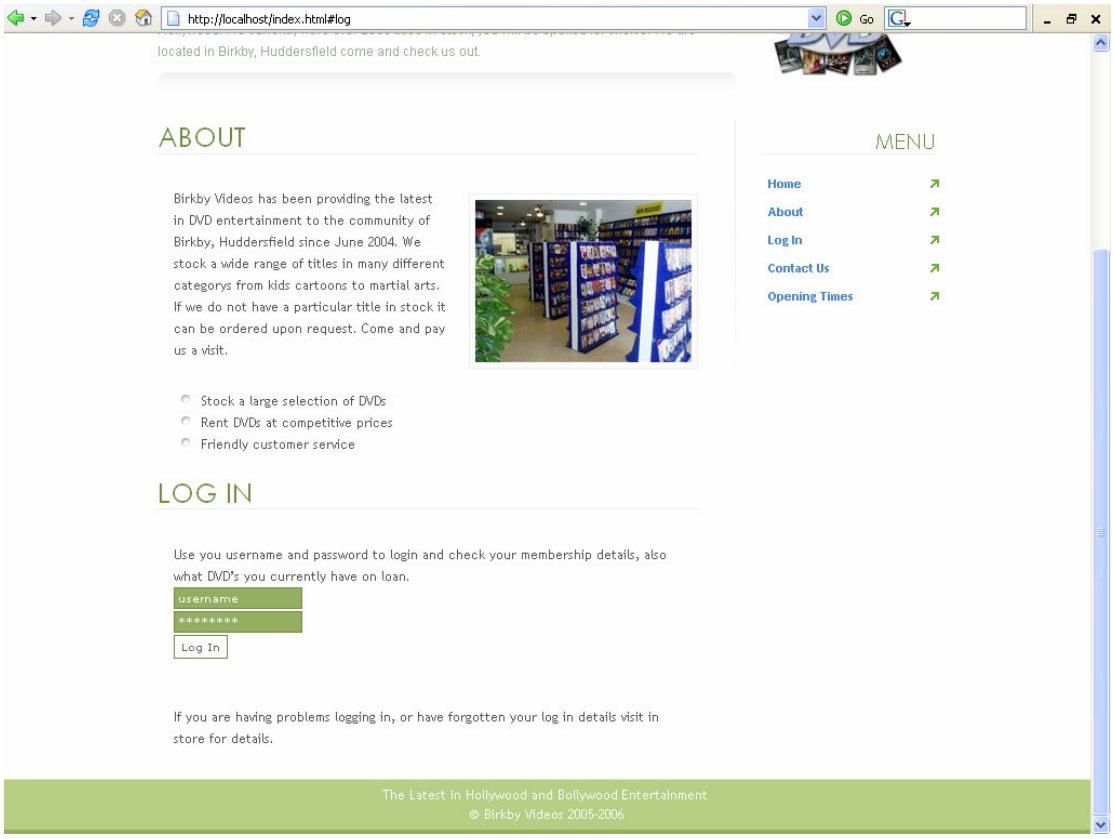
Appendix C: Website

Below are screenshots of the webpage's of the website.

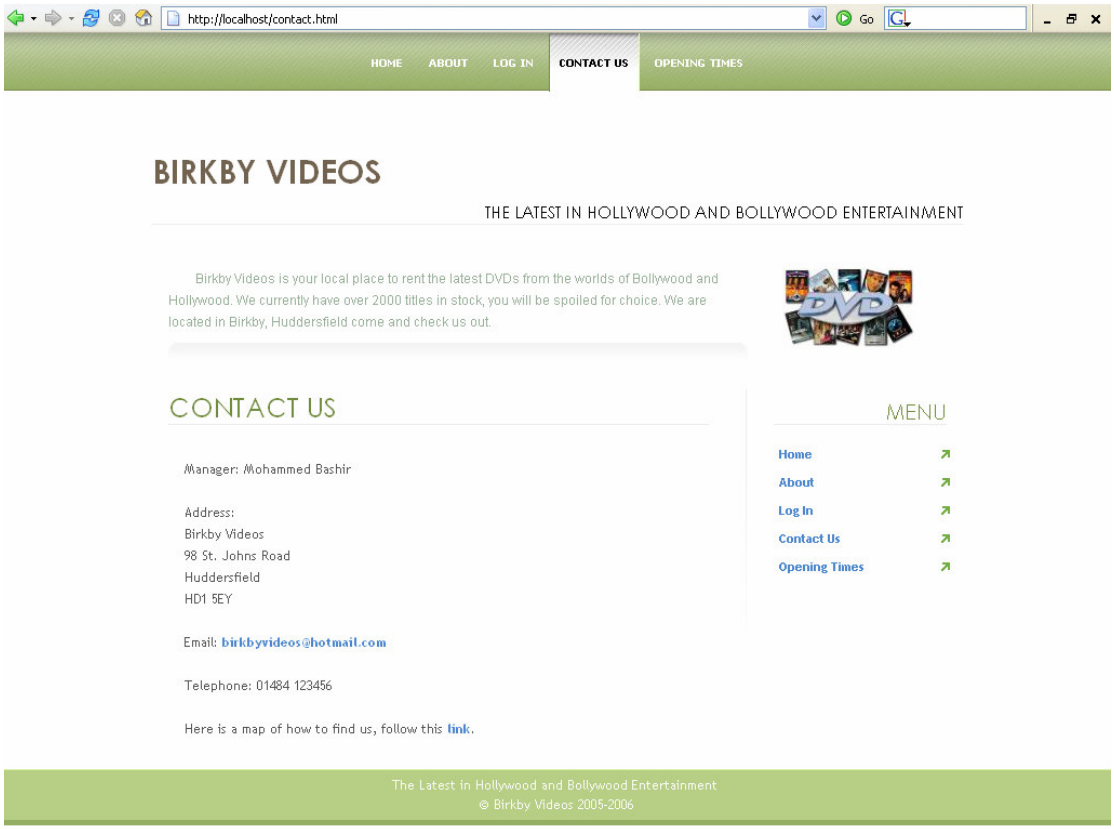
HOME


http://localhost/index.html
Go
HOME
ABOUT
LOG IN
CONTACT US
OPENING TIMES
BIRKBY VIDEOS
THE LATEST IN HOLLYWOOD AND BOLLYWOOD ENTERTAINMENT
Birkby Videos is your local place to rent the latest DVDs from the worlds of Bollywood and Hollywood. We currently have over 2000 titles in stock, you will be spoiled for choice. We are located in Birkby, Huddersfield come and check us out.
ABOUT
Birkby Videos has been providing the latest in DVD entertainment to the community of Birkby, Huddersfield since June 2004. We stock a wide range of titles in many different categorys from kids cartoons to martial arts. If we do not have a particular title in stock it can be ordered upon request. Come and pay us a visit.
Stock a large selection of DVDs
Rent DVDs at competitive prices
Friendly customer service
MENU
Home
About
Log In
Contact Us
Opening Times
LOG IN
Use you username and password to login and check your membership details, also

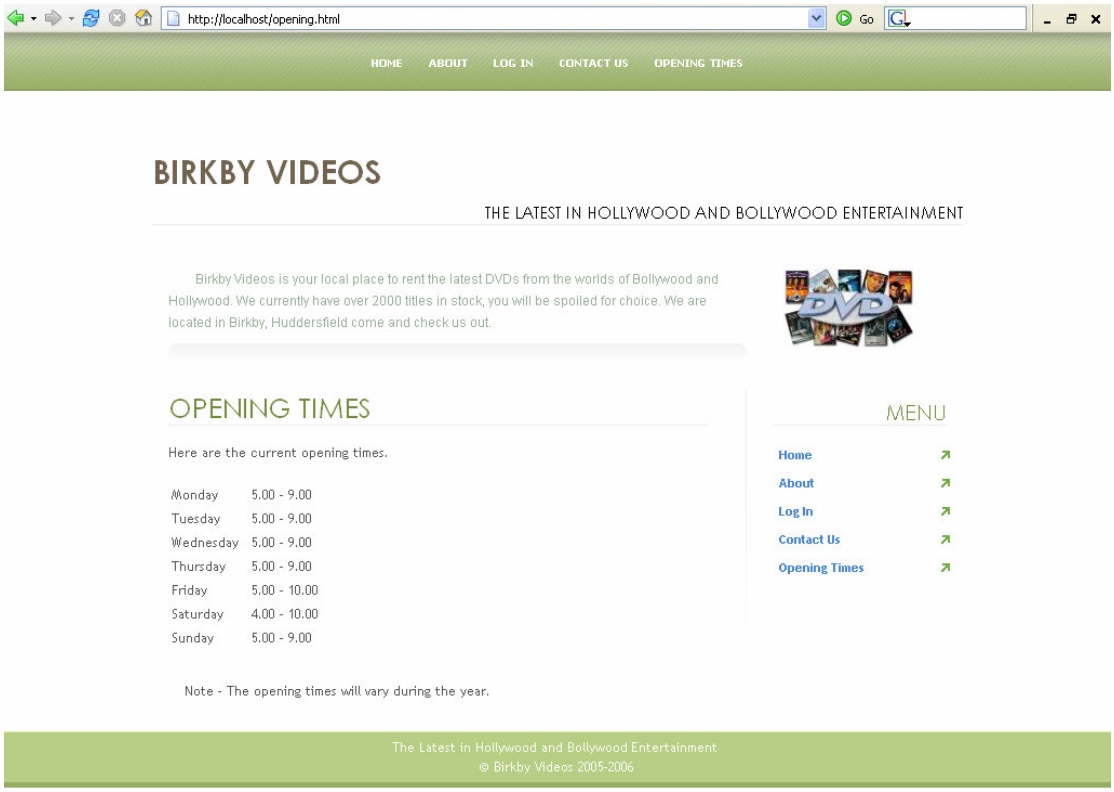
LOGIN


http://localhost/index.html#log
Go
located in Birkby, Huddersfield come and check us out.
ABOUT
Birkby Videos has been providing the latest in DVD entertainment to the community of Birkby, Huddersfield since June 2004. We stock a wide range of titles in many different categorys from kids cartoons to martial arts. If we do not have a particular title in stock it can be ordered upon request. Come and pay us a visit.
Stock a large selection of DVDs
Rent DVDs at competitive prices
Friendly customer service
LOG IN
Use you username and password to login and check your membership details, also what DVD's you currently have on loan.
username
****
Log In
If you are having problems logging in, or have forgotten your log in details visit in store for details.
MENU
Home
About
Log In
Contact Us
Opening Times
The Latest in Hollywood and Bollywood Entertainment
© Birkby Videos 2005-2006

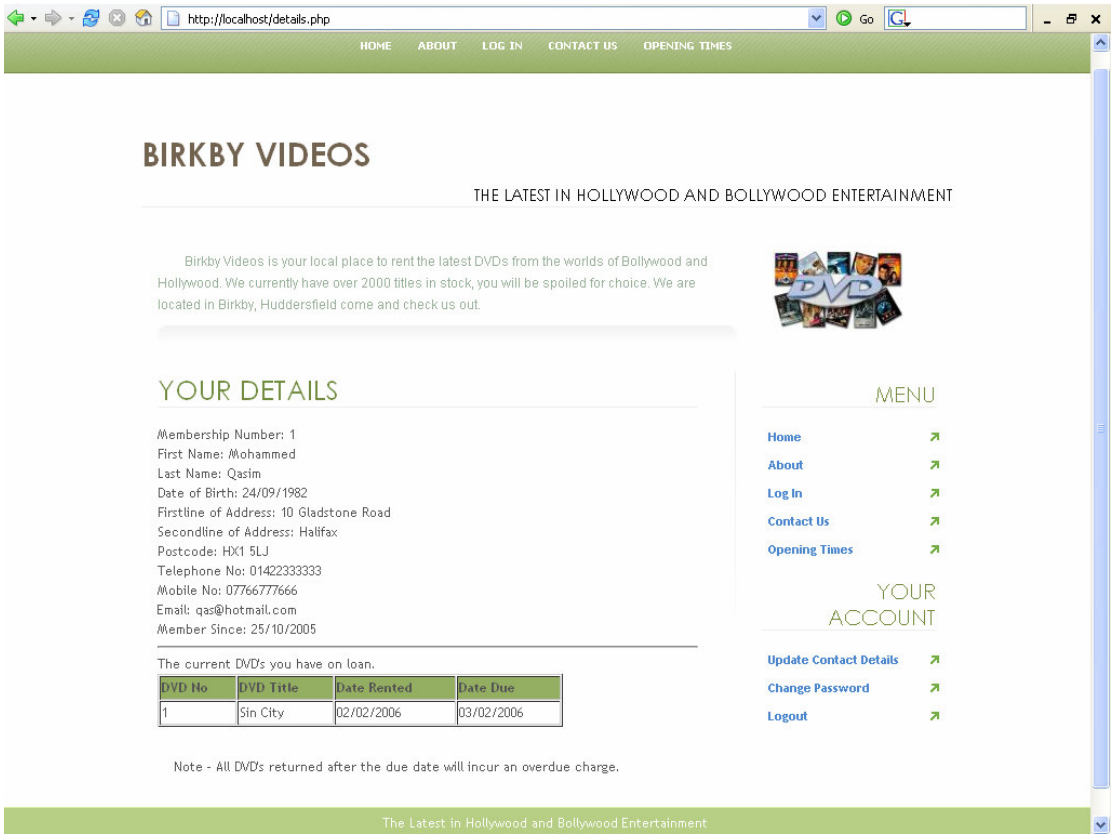
CONTACT US


http://localhost/contact.html
Go
HOME
ABOUT
LOG IN
CONTACT US
OPENING TIMES
BIRKBY VIDEOS
THE LATEST IN HOLLYWOOD AND BOLLYWOOD ENTERTAINMENT
Birkby Videos is your local place to rent the latest DVDs from the worlds of Bollywood and Hollywood. We currently have over 2000 titles in stock, you will be spoiled for choice. We are located in Birkby, Huddersfield come and check us out.
CONTACT US
Manager: Mohammed Bashir
Address:
Birkby Videos
98 St. Johns Road
Huddersfield
HD1 5EY
Email: birkbyvideos@hotmail.com
Telephone: 01484 123456
Here is a map of how to find us, follow this link.
MENU
Home
About
Log In
Contact Us
Opening Times
The Latest in Hollywood and Bollywood Entertainment
© Birkby Videos 2005-2006

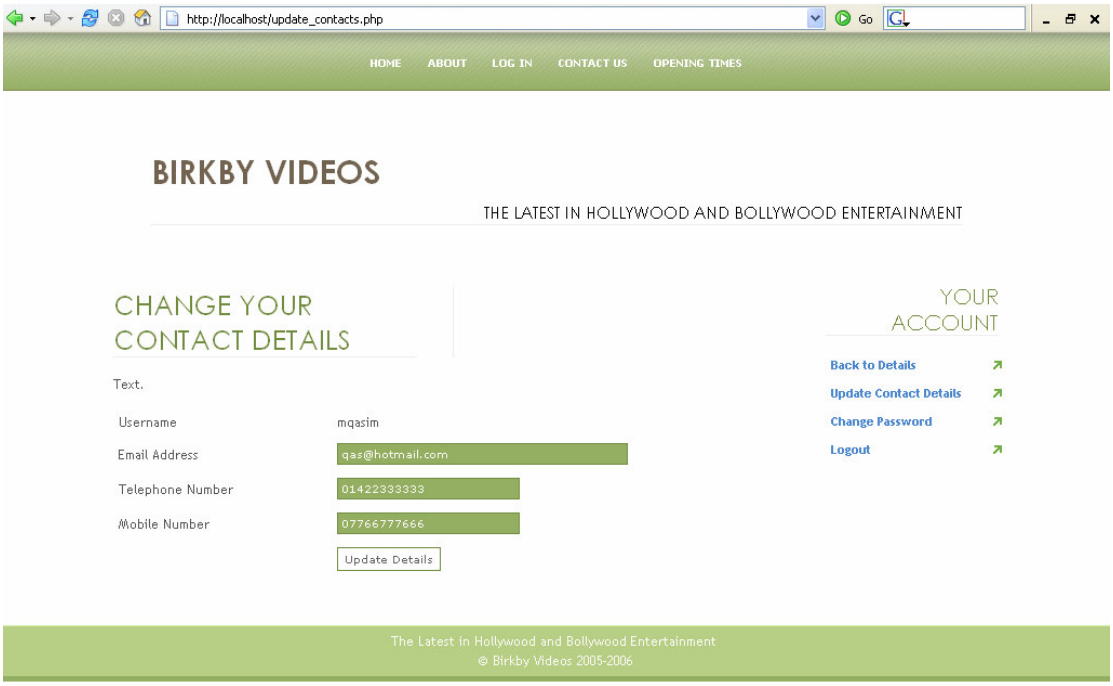
OPENING TIMES


http://localhost/opening.html
Go
HOME
ABOUT
LOG IN
CONTACT US
OPENING TIMES
BIRKBY VIDEOS
THE LATEST IN HOLLYWOOD AND BOLLYWOOD ENTERTAINMENT
Birkby Videos is your local place to rent the latest DVDs from the worlds of Bollywood and Hollywood. We currently have over 2000 titles in stock, you will be spoiled for choice. We are located in Birkby, Huddersfield come and check us out.
OPENING TIMES
Here are the current opening times.
Monday 5.00 - 9.00
Tuesday 5.00 - 9.00
Wednesday 5.00 - 9.00
Thursday 5.00 - 9.00
Friday 5.00 - 10.00
Saturday 4.00 - 10.00
Sunday 5.00 - 9.00
Note - The opening times will vary during the year.
MENU
Home
About
Log In
Contact Us
Opening Times
The Latest in Hollywood and Bollywood Entertainment
© Birkby Videos 2005-2006

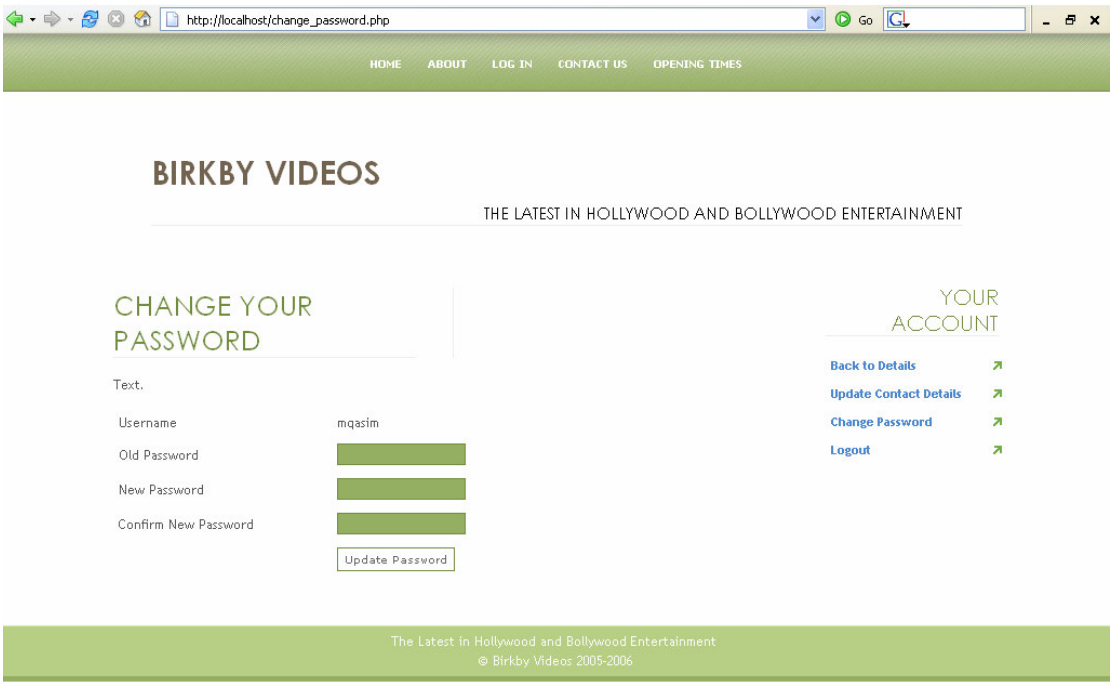
YOUR DETAILS



CHANGE CONTACT DETAILS



CHANGE PASSWORD



Appendix D: PHP Code

Here is some of the PHP code from the scripts I created.

Please note that these are not the complete scripts.

odbc.php

```
<?php

$odbc = odbc_connect ('BirkbyDB', 'root', '') or die('Could    Not Connect to ODBC Database!');

?>
```

check_login.php

```
<?php

session_start(); // to use session access

if(empty($_POST['username']))
{
	$message_str = 'Login Failed! You did not enter your Username! <a href="index.html">Click here to try again</a>';
}
elseif( empty($_POST['password']) )
{
	$message_str = 'Login Failed! You did not enter your Password! <a href="index.html">Click here to try again</a>';
}
else
{
	require_once('odbc.php');

	$query = "SELECT * FROM OnlineUser INNER JOIN Member ON OnlineUser.MemberNo = Member.MemberNo
				WHERE OnlineUser.Username = '".$_POST['username']."' ";

	$result = odbc_exec($odbc, $query)
				or die (odbc_errormsg());

	if($result)
	{
		$row = odbc_fetch_array($result);  // get row

		if( $row["Password"] == $_POST['password'])  // check password
		{
			$message_str ='Login Successful!  <a href="details.php">Click here to continue</a>';
			$_SESSION['username'] = $_POST['username'];
			$_SESSION['member_no'] = $row["MemberNo"];
		}
		else
		{
			$message_str = 'Login Failed! Username or Password is incorrect! <a href="index.html">Click
			here to try again</a>';
		}
	}
}

?>
```

details.php

```
<?php
		session_start();  // initiate session

		// check that session username exists and is not empty!
		if( !isset($_SESSION['username']) || (empty($_SESSION['username'])) )
		{
			header("Location: index.html"); // otherwise boot to login page
		}
?>

<?php
require_once('odbc.php');
$sql = "SELECT * FROM Member WHERE MemberNo = " . $_SESSION['member_no'];
$query = odbc_exec($odbc, $sql) or die (odbc_errormsg());
while($row = odbc_fetch_array($query))
{

		$dob_year = substr($row['DateOfBirth'], 0, 4);
		$dob_month = substr($row['DateOfBirth'], 5, 2);
		$dob_day = substr($row['DateOfBirth'], 8, 2);
		$dob = $dob_day . '/' . $dob_month . '/' . $dob_year;

		$datejoined_year = substr($row['DateJoined'], 0, 4);
		$datejoined_month = substr($row['DateJoined'], 5, 2);
		$datejoined_day = substr($row['DateJoined'], 8, 2);
		$datejoined = $datejoined_day . '/' . $datejoined_month . '/' . $datejoined_year;

		echo 'Membership Number: '.$row['MemberNo'].'<br />';
		echo 'First Name: '.$row['FirstName'].'<br />';
		echo 'Last Name: '.$row['LastName'].'<br />';
		echo 'Date of Birth: '.$dob.'<br />';
		echo 'Firstline of Address: '.$row['FirstLineAddress'].'<br />';
		echo 'Secondline of Address: '.$row['SecondLineAddress'].'<br />';
		echo 'Postcode: '.$row['PostCode'].'<br />';
		echo 'Telephone No: '.$row['TelephoneNo'].'<br />';
		echo 'Mobile No: '.$row['MobileNo'].'<br />';
		echo 'Email: '.$row['Email'].'<br />';
		echo 'Member Since: '.$datejoined.'<br />';
		echo '<hr \>';   // <hr width="50%" siz3="3">
}
odbc_close($odbc);
?>

<table id="details">

<body bgcolor="#FFFFFF">
<table width="75%" border="1" cellspacing="1" cellpadding="1" bgcolor="#FFFFFF">
<tr bgcolor="#94AE62">
		<td height="22"><b>DVD No</b></td>
		<td height="22"><b>DVD Title</b></td>
		<td height="22"><b>Date Rented</b></td>
		<td height="22"><b>Date Due</b></td>
</tr>

<?php
require_once('odbc.php');
$sql = "SELECT Rental.DVDNo, DVD.MovieTitle, Rental.DateRented, Rental.DateDue
FROM DVD INNER JOIN Rental ON DVD.DVDNo=Rental.DVDNo
WHERE Rental.MemberNo= ".$_SESSION['member_no']." AND Rental.DateReturned Is Null
";
$query = odbc_exec($odbc, $sql) or die (odbc_errormsg());
echo "The current DVD's you have on loan. <br>";

//query database
while(odbc_fetch_row($query))
{
$dvdno = odbc_result($query, 1);
$dvdtitle = odbc_result($query, 2);
$daterented = odbc_result($query, 3);
$datedue = odbc_result($query, 4);

		$daterented_year = substr($daterented, 0, 4);
		$daterented_month = substr($daterented, 5, 2);
```

```
            $daterented_day = substr($daterented, 8, 2);
            $daterented = $daterented_day . '/' . $daterented_month . '/' . $daterented_year;

            $datedue_year = substr($datedue, 0, 4);
            $datedue_month = substr($datedue, 5, 2);
            $datedue_day = substr($datedue, 8, 2);
            $datedue = $datedue_day . '/' . $datedue_month . '/' . $datedue_year;

  //format results
  echo "<tr>";
  echo "<td>$dvdno</td>";
  echo "<td>$dvdtitle</td>";
  echo "<td>$daterented</td>";
  echo "<td>$datedue</td>";
  echo "</tr>";
  }

odbc_close($odbc);
?>
```

update_contacts.php

```
<?php
            session_start();  // initiate session

            // check that session username exists and is not empty!
            if( !isset($_SESSION['username']) || (empty($_SESSION['username'])) )
            {
                        header("Location: index.html"); // otherwise boot to login page
            }

            require_once('odbc.php');

            $query = "SELECT *
                                    FROM Member
                                    WHERE MemberNo = ".$_SESSION['member_no']."
                                   ";

            $result = odbc_exec($odbc, $query) or die (odbc_errormsg());

            if($result)
            {
                        $row = odbc_fetch_array($result);
            }
?>
```

process_contacts.php

```
<?php
            session_start();  // initiate session

            // check that session username exists and is not empty!
            if( !isset($_SESSION['username']) || (empty($_SESSION['username'])) )
            {
                        header("Location: index.html"); // otherwise boot to login page
            }

            if( empty($_POST['telephone']) )
            {
                        $message = 'Update Failed! Please enter your telephone number! <a href="update_contacts.php">Click
                        here to try again</a>';
            }
            else
            {
                        require_once('odbc.php');

                        $query = "update Member set
                                                                TelephoneNo =  '".$_POST['telephone']."',
                                                                MobileNo =  '".$_POST['mobile']."',
                                                                Email =  '".$_POST['email']."'
                                                where MemberNo = ".$_SESSION['member_no']."
                                                ";
```

```
                odbc_exec($odbc, $query) or die (odbc_errormsg());      // insert into login

                $message ='Your contact details have been updated successfully!   <a href="details.php">Click here to
                continue</a>';
        }
?>
```

change_password.php

```
<?php
        session_start();  // initiate session

        // check that session username exists and is not empty!
        if( !isset($_SESSION['username']) || (empty($_SESSION['username'])) )
        {
                header("Location: index.html"); // otherwise boot to login page
        }
?>
```

process_password.php

```
<?php
        session_start();  // initiate session

        // check that session username exists and is not empty!
        if( !isset($_SESSION['username']) || (empty($_SESSION['username'])) )
        {
                header("Location: index.html"); // otherwise boot to login page
        }

        if( empty($_POST['old_password']) )
        {
                $message = 'Change Password Failed! Old Password is empty! <a href="change_password.php">Click
                here to try again</a>';
        }
        elseif( empty($_POST['new_password']) )
        {
                $message = 'Change Password Failed! New Password is empty! <a href="change_password.php">Click
                here to try again</a>';
        }
        elseif( empty($_POST['confirm_password']) )
        {
                $message = 'Change Password Failed! Password Confirmation is empty! <a
                href="change_password.php">Click here to try again</a>';
        }
        elseif($_POST['new_password'] != $_POST['confirm_password'])
        {
                $message = 'Change Password Failed! Passwords do not match! <a href="change_password.php">Click
                here to try again</a>';
        }
        else
        {
                require_once('odbc.php');

                $query = "SELECT Password
                                        FROM OnlineUser
                                        WHERE Username = '".$_SESSION['username']."'
                                        ";

                $result = odbc_exec($odbc, $query) or die (odbc_errormsg());
                $row = odbc_fetch_array($result);

                if($row['Password'] == $_POST['old_password'])
                {

                        $query = "update OnlineUser set
                                                                Password =  '".$_POST['new_password']."'
                                                where MemberNo = ".$_SESSION['member_no']."
                                                ";

                        odbc_exec($odbc, $query) or die (odbc_errormsg());      // insert into login
```

```
                        $message ='Your password has been updated successfully!   <a href="details.php">Click here
                        to continue</a>';
                }
                else
                {
                        $message = 'Change Password Failed! Old Password does not match! <a
                        href="change_password.php">Click here to try again</a>';
                }
        }
?>
```

logout.php

```
<?php
        session_start();

        // reset session
        $_SESSION['username'] = "";
        $_SESSION['member_no'] = "";

        // redirect to home page
        header("Location: index.html");
?>
```

Appendix E: Non-technical User Manual

Birkby Videos Database Application User-Manual

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1 – Getting Started

1.1 Introduction

Welcome to the non-technical user manual for the database application of Birkby Videos. This is a simple, easy to understand user manual, which will guide you through the process to carry out the required tasks.

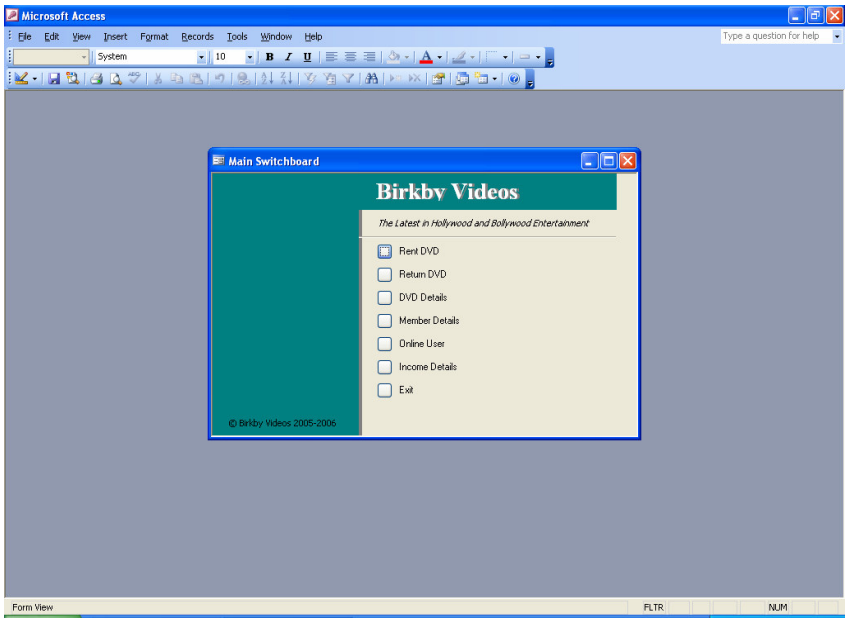
By the end of this user manual you will completely understand how to use the application and this will allow you to carry out the required tasks, this will include:

- Loan out a DVD to a member.
- Add a new membership.
- Check a member's rental history.
- AND MUCH MORE.

I hope you enjoy this manual and find it useful.

1.2 Starting The Application

Click on the following icon on the desktop called 'Birkby Videos'.



The application will then load up, as shown above.

2 – The Main Menu

2.1 Main Menu At A Glance

From the Main Menu you can navigate through the application and carry out the required tasks.

The seven buttons on the Main Menu carry out the following operations:

Rent DVD	Brings up the form to rent a DVD.
Return DVD	Brings up the form to return a DVD.
DVD Details	Takes you to 'DVD Details' menu.
Member Details	Takes you to 'Member Details' menu.
Online User	Brings up a form to add/cancel an online user.
Income Details	Takes you to 'Income Details' menu.
Exit	Closes the application.

2.2 Rent A DVD

To loan a DVD to a member, click on 'Rent DVD' in the Main Menu and the following form will appear.

Enter the member's number in 'Member No', the DVD number in 'DVD No', today's date in 'DateRented' and the due date of the DVD in 'DateDue'.

NOTE Enter the dates in the form DD/MM/YY or DD/MM/YYYY throughout the whole application when required.

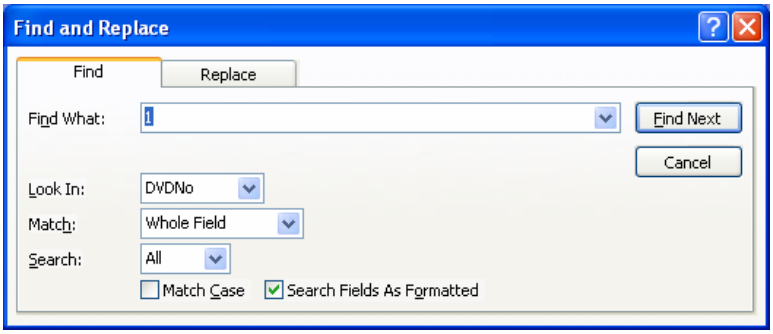
To rent out another DVD click on 'Rent DVD', and this will clear the fields in the form so you can rent another DVD.

Click on the following button to close the form.

2.3 Return A DVD

If a customer returns a DVD, click on 'Return DVD' in the Main Menu and the following form will appear.

To find the DVD you want to return, you can either use the arrows at the bottom of the form to search through all the DVD's currently out on loan or the quicker method is to click on 'Find DVD No' and the following window will pop up.

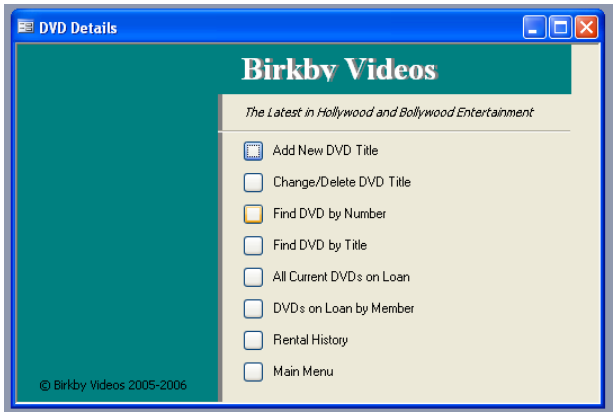


Enter the DVD number in the 'Find What:' field, click on 'Find Next' and it will find the DVD you are looking for. Then close this window and enter the today's date (the date the DVD was returned) in 'DateReturned' and you can repeat this process if another DVD is required to be returned.

Click on the following button to close the Return DVD form.

2.4 DVD Details

The 'DVD Details' button on the Main Menu takes you to the DVD Details menu, as follows.



The eighth buttons on the DVD details menu carry out the following operations:

Add New DVD Title	Brings up the form to add a new DVD title.
Change/Delete DVD Title	Brings up the form to change or delete a DVD title.
Find DVD by Number	Brings up the window to find a DVD by its number.
Find DVD by Title	Brings up the window to find a DVD by its title.
All Current DVDs on Loan	Displays all the current DVD's out on loan and when they are due back.
DVDs on Loan by Member	Brings up the window to find the DVD's on loan by a particular member.
Rental History	Brings up the window to find the complete rental history of a particular DVD title.
Main Menu	Takes you back to the Main Menu.

2.5 Member Details

The 'Member Details' button on the Main Menu takes you to the Member Details menu, as follows.

The seven buttons on the Member Details menu do the following operations:

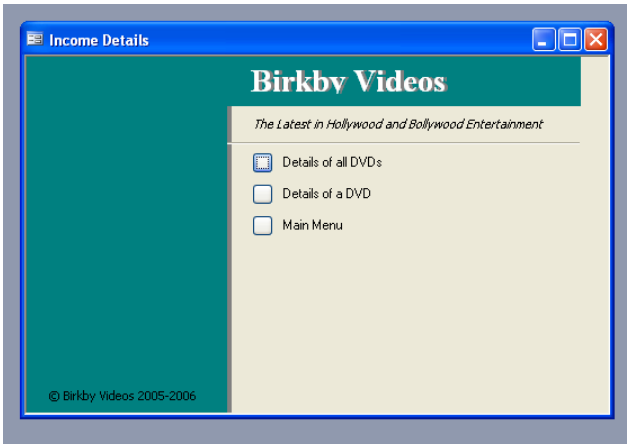
Add New Member	Brings up the form to add a new member.
Cancel/Change a Membership	Brings up the form to cancel or delete a membership.
Find Details by Membership No	Brings up the window to find a member by his/her membership number.
Find Details by Date of Birth	Brings up the window to find a member by his/her date of birth.
Find Details by Name	Brings up the window to find a member by his/her name.
Members Rental History	Brings up the window to find the complete rental history of a particular member.
Main Menu	Takes you back to the Main Menu.

2.6 Online User

If you require adding a member to have online access, cancel a member's online access or find a member's online login details, click on 'Online User' in the Main Menu. The following window will appear.

2.7 Income Details

The ‘Income Details’ button on the Main Menu takes you to the Income Details menu, as follows.



The three buttons on the Income Details menu do the following operations:

Details of all DVDs	Displays the income details, along with how many times it has been rented for all the DVD’s.
Details of a DVD	Brings up the window to display the income details of a particular DVD, along with how many times it has been rented.
Main Menu	Takes you back to the Main Menu.

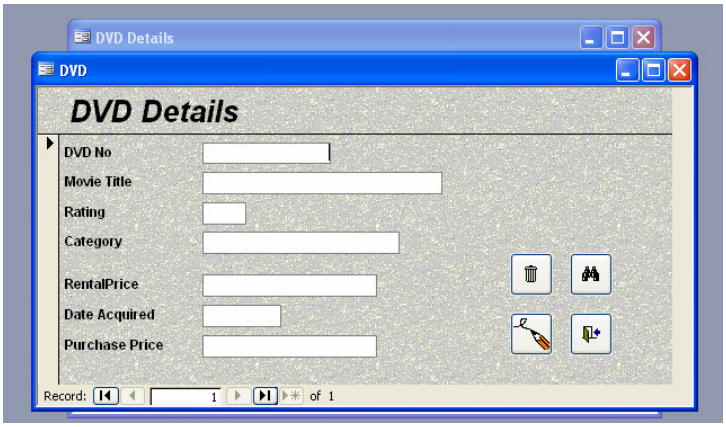
2.8 Exiting The Application

To exit the application, click of the button ‘Exit’ in the Main Menu, and this will exit the application.

3 – DVD Details

3.1 Add New DVD Title

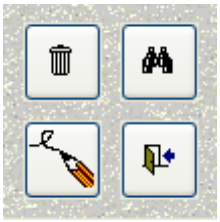
To add a new DVD title, click on 'Add New DVD Title' in the DVD Details menu and the following form will appear.



Fill in the above fields in the window, the DVD number, title, rating, category, rental price, date the DVD was acquired and the purchase price.

To add another DVD title click on the bottom left button in the cluster of four, and this allow you to add another DVD title by clearing all the fields.

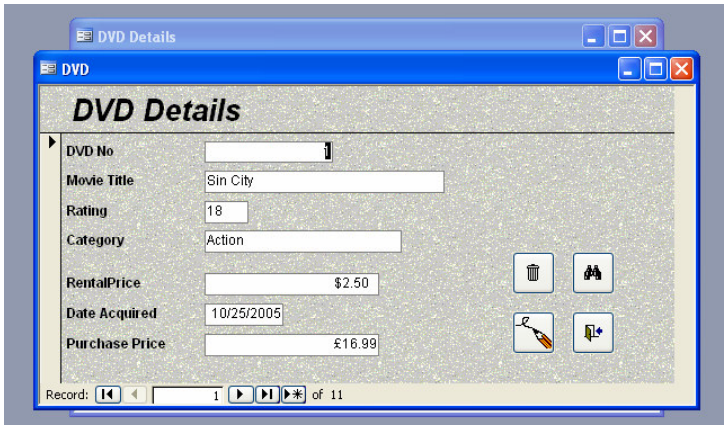
NOTE The following four buttons on a form will always carry out the following operations:



Top Left	Deletes a record.
Top Right	Opens up the search find to find a record.
Bottom Left	Adds a new record.
Bottom Right	Closes the form.

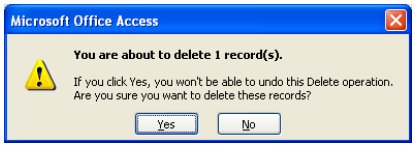
3.2 Delete A DVD Title

To delete a DVD title, click on 'Change/Delete DVD Title' in the DVD Details menu and the following form shown on the next page will appear.



To delete a record, find the DVD by either using the arrows at the bottom of the form or search for the title by clicking on the top right button and the search window will appear. Section 2.3 shows you how to search for a particular title.

The following warning will appear when clicking on the delete button.

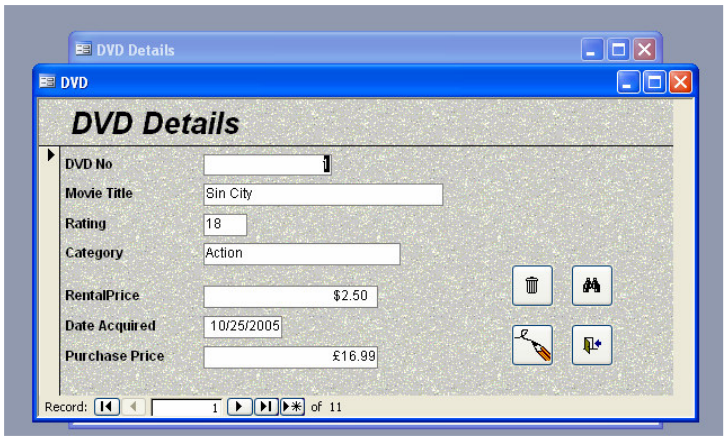

Microsoft Office Access
You are about to delete 1 record(s).
If you click Yes, you won't be able to undo this Delete operation.
Are you sure you want to delete these records?
Yes
No

Click 'Yes' to confirm your deletion.

You will have successfully deleted a title.

3.3 Changing Details Of A DVD Title

To change the details of a DVD, click on 'Change/Delete DVD Title' in the DVD Details menu and the following form will appear.



Find the DVD title you want to make changes to, as discussed above in section 3.2. Then make the required changes and click on the bottom right

button to close the window when finished, or repeat the process if another change needs to be made.

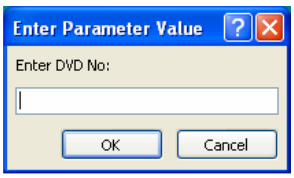
NOTE When required to enter an amount in pounds you do not have to include the pound sign '£', it will be automatically added when the field is complete.

3.4 Find DVD Title

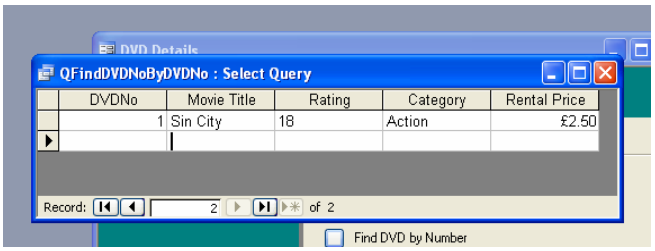
In order to find a particular DVD title click on 'Find DVD by Number' or 'Find DVD by Title' in the DVD Details menu, depending on whether you want to search for it by its number or title.

3.4.1 By Number

By clicking on 'Find DVD by Number' the following window will appear.

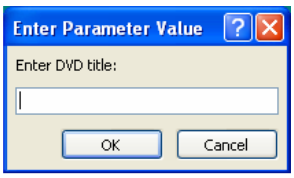


Enter the DVD number in the field, click 'OK' and the details of that DVD will appear. An example search result is shown below.



3.4.2 By Title

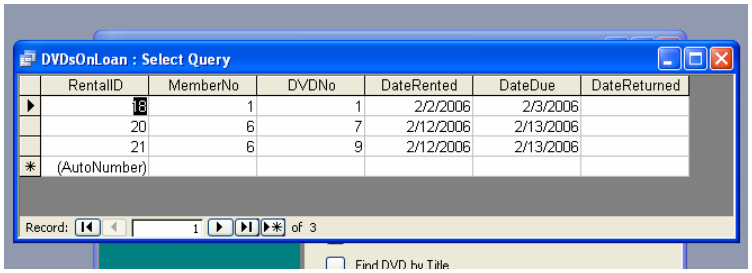
By clicking on 'Find DVD by Title' the following window will appear.



Enter the DVD title in the field, click 'OK' and the details of that DVD will appear. An example search result is shown above in section 3.4.1.

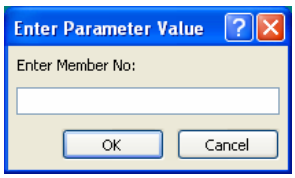
3.5 All Current DVD's On Loan

To find all the DVD titles currently out on loan, to which member and when they are due back click on 'All Current DVDs on Loan' in the DVD Details menu. An example result is shown below.

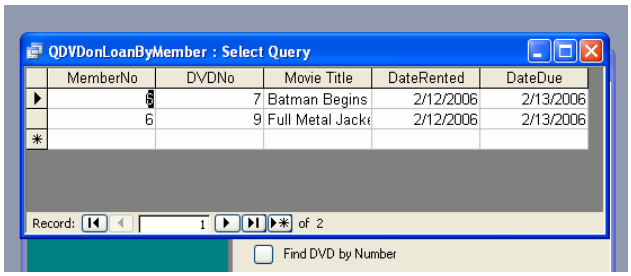


3.6 DVD's On Loan by Member

To find all the DVD titles currently out on loan to a particular member and when they are due back click on 'DVDs on Loan by Member' in the DVD Details menu and the following window will appear.

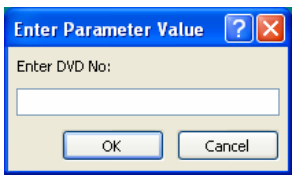


Enter the member's membership number in the field and click 'OK'. An example results is shown below.

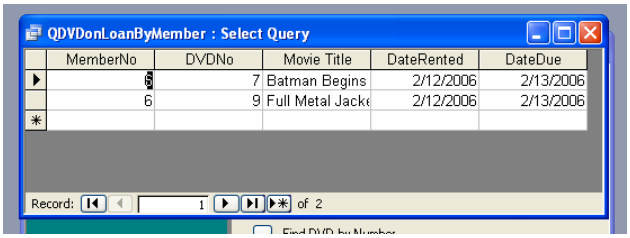


3.7 Rental History

To find the complete rental history of a particular DVD title click on 'Rental History' in the DVD Details menu and the following window will appear.



Enter the number of the DVD you want the history for and click ‘OK’. The rental history will appear and an example search result is shown below.

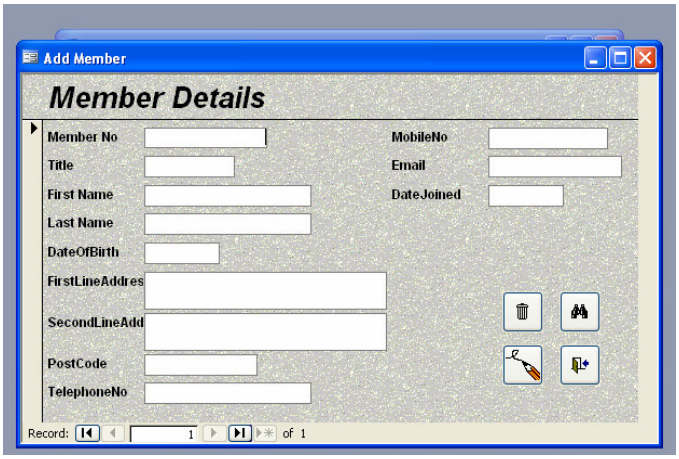


You will have successfully found the complete rental history of a particular DVD.

4 – Member Details

4.1 Add A New Membership

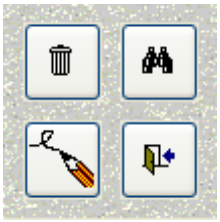
To add a new Membership, click on ‘Add New Member’ in the Member Details menu and the following form will appear.



Fill in the above fields in the form, the new member number, title, first name, last name, date of birth, first line of address, second line of address, post code, telephone number, mobile number, email address and the date the member joined.

To add another new member click on the bottom left button in the cluster of four, and this allow you to add another member by clearing all the fields.

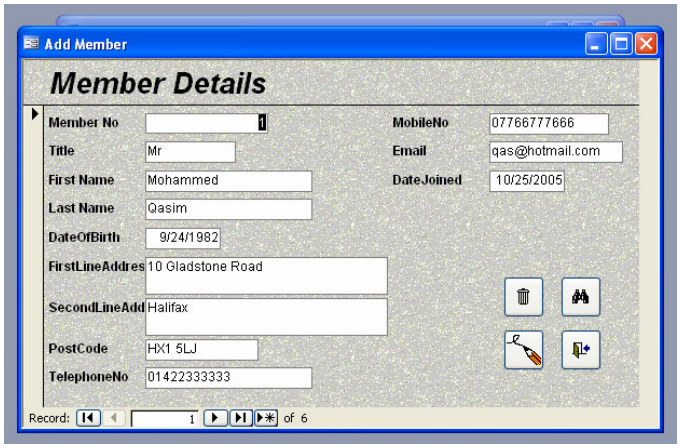
NOTE The following four buttons will always carry out the following operations:



Top Left	Deletes a record.
Top Right	Opens up the search find to find a record.
Bottom Left	Adds a new record.
Bottom Right	Closes the form.

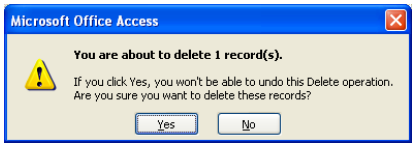
4.2 Cancel A Membership

To cancel a membership click on ‘Cancel/Change a Membership’ in the Member Details menu and the following form will appear as shown on the next page.



To delete a membership, first find the member by either using the arrows at the bottom of the form or search for the member by clicking on the top right button and the search window will appear. Section 2.3 shows you how to search for a particular member.

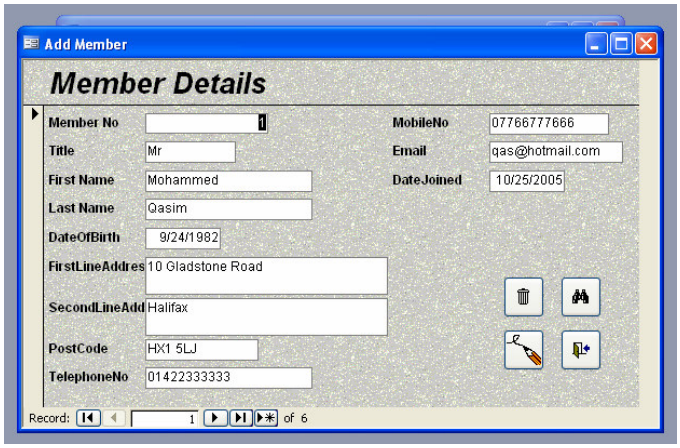
The following warning will appear when clicking on the delete button and click 'Yes' to confirm your deletion.


Microsoft Office Access
You are about to delete 1 record(s).
If you click Yes, you won't be able to undo this Delete operation.
Are you sure you want to delete these records?
Yes
No

You will have successfully canceled a membership.

4.3 Changing Details Of A Member

To change the details of a member, click on 'Cancel/Change a Membership' in the Member Details menu and the following form will appear.



Find the member details you want to change, as discussed above in section 3.2. Then make the required changes and click on the bottom right button to

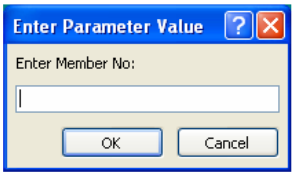
close the window when finished, or repeat the process if another change needs to be made.

4.4 Find Member Details

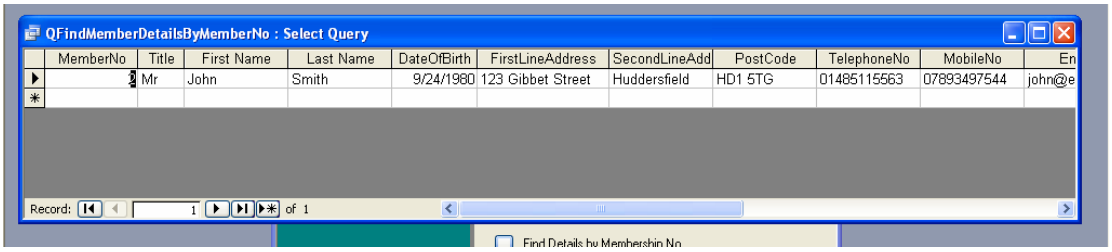
In order to find the details of a particular member click on 'Find Details by Membership No', 'Find Details by Date of Birth' or 'Find Details by Name' in the Member Details menu, depending on whether you want to search for a member by his/her membership number, date of birth or name.

4.4.1 By Membership Number

By clicking on 'Find Details by Membership No' the following window will appear.

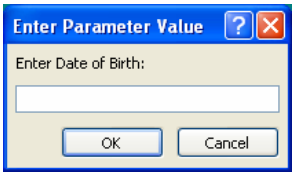


Enter the member's membership number in the field, click 'OK' and the member's details will appear. An example search result is shown below.



4.4.2 By Date Of Birth

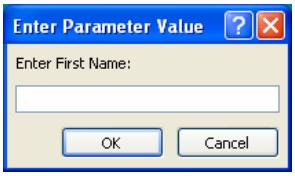
By clicking on 'Find Details by Date of Birth' the following window will appear.

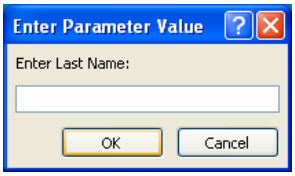


Enter the member's date of birth in the field, click 'OK' and the member's details will appear. An example search result is shown above in section 4.4.1.

4.4.3 By Name

By clicking on ‘Find Details by Name’ the following window will first appear.



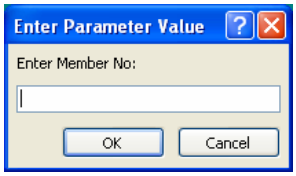


Enter the members first name in the field, click ‘OK’ and this second window will appear asking for the member’s last name, click ‘OK’ again and the member’s details will appear. An example search result shown in section 4.4.1.

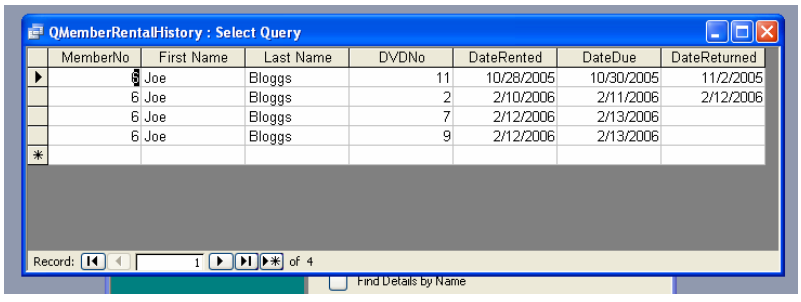
You will have successfully searched for a particular member’s details.

4.5 Members Rental History

To find the complete rental history of a particular member, click on ‘Members Rental History’ in the Member Details menu and the following window will appear.

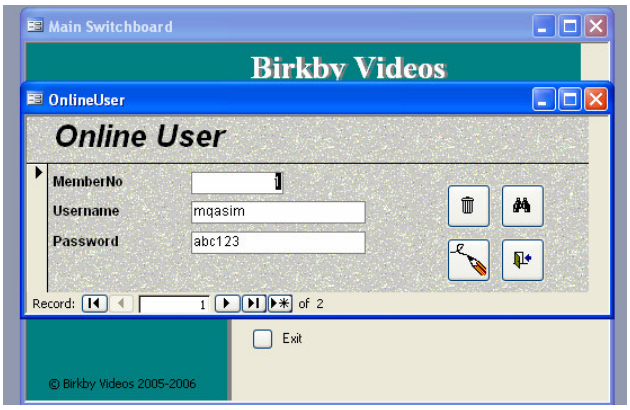


Enter the member’s membership number in the field, click ‘OK’ and the member’s complete rental history will be shown. An example search results in shown below.



5 – Online User

If you require adding a member to have online access, cancel a member's online access or find a member's online login details, click on 'Online User' in the Main Menu and the following form will appear.



5.1 Add An Online User

To add online access for a member click on the bottom left button in the cluster of four as shown above and fill in the required fields, membership number, username and password.

5.2 Cancel An Online User

To cancel a member's online access, first search for the member's online details as shown in section 2.3. Once found click on the top left button and a warning message will appear then click 'OK' and this will delete the record.

5.3 Find An Online User

To find the online details of a member click on the top right button and the search window will appear, section 2.3 shows you how to use this to search for a particular member.

6 – Income Details

6.1 Details Of All The DVD's

To find the income details of all the DVD titles, along will how many times the DVDs have been rented, click on 'Details of all DVDs' in the Income Details Menu. The table will look something like this.

TotalIncome : Select Query

DVDNo	Movie Title	Rating	Category	Rental Price	Date Acquired	Purchase Price	TotalIncome	NoOfTimesRented
1	Sin City	18	Action	£2.50	25/10/2005	£16.99	£2.50	2
2	Robots	U	Kids	£2.50	24/10/2005	£15.99	£7.50	2
3	Friday	15	Comedy	£2.00	25/10/2005	£9.99	£6.00	2
4	Scarface	18	Crime	£2.00	25/10/2005	£9.00	£2.00	1
6	Batman Begins	12	Action	£2.50	28/10/2005	£15.99	£2.50	1
7	Batman Begins	12	Action	£2.50	28/10/2005	£15.99		1
8	Kingdom of Heaven	15	Action	£2.50	28/10/2005	£12.99	£15.00	1
9	Full Metal Jacket	18	War	£2.00	28/10/2005	£7.99	£2.00	2
10	Kung Fu Hustle	15	Action/Comedy	£2.50	28/10/2005	£12.99	£2.50	1
11	The Office Series 1	15	Comedy	£2.00	28/10/2005	£13.99	£10.00	1

Record: 1 of 10

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6.2 Details Of A Particular DVD

To find the income details of a particular DVD click on 'Details of a DVD' in the Income Details menu. A window will appear asking for the number of the DVD, enter the number and click 'OK'. A table will appear showing the details of that particular DVD, an example shown below.

QTotalIncome : Select Query

DVDNo	Movie Title	Rating	Category	Rental Price	Date Acquired	Purchase Price	TotalIncome	NoOfTimesRented
3	Friday	15	Comedy	£2.00	10/25/2005	£9.99	£6.00	2

Record: 1 of 1

Details of a DVD

7 – Help

7.1 Additional Help

If you require additional help please contact me on the email address below.

7.2 Reporting Bugs

If you find a bug in the application please report the problem by contacting me on to the following email address.

scs2mq@comp.leeds.ac.uk